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CHEMICAL AGE

BOUVERIE HOUSE • 154 FLEET STREET • LONDON • EC4

THE CANADIAN SCENE

A NEW production record was set up in 1957 by Canada's chemical and allied products group of industries, when the gross value of factory shipments reached \$1,201,900,000, some 8 per cent greater than the preceding year's \$1,111,200,000, the Bureau of Statistics in Ottawa has reported in a preliminary statement. Records have also been set up in the number of employees, totalling 54,601 (52,821 in 1956), salaries and wages at \$218,056,000 (\$200,743,000), and cost of materials and supplies at \$561,696,000 (\$526,564,000).

Of the individual industries in the chemicals and allied products group, the largest proportionate increase in factory value of shipments (43 per cent) has been recorded by the vegetable oils industry. Heavy chemicals, however, have shown a 17 per cent increase, compressed gases 15 per cent, primary plastics 12 per cent, adhesives 11 per cent, and soaps, washing compounds, polishes and dressings 9 per cent each.

These figures gain in significance when at the same time foreign investment in Canada is considered. Since 1900 Canada has seen a steady growth in foreign investment and of late years the entry of foreign capital, particularly into the chemical industry, has increased markedly. S. J. Cook, writing in *Chemical and Engineering News* (1958 36, No. 23, p. 84) records that whereas total non-resident investment in 1900 was reported at \$1.23 billion, in 1926 it had risen to \$15.4 billion. US investments in Canada during these years were 1900, \$168 million; 1926, \$3.2 billion; 1956, \$11.7 billion—a 70-fold increase in half a century. A substantial increase occurred last year. In fact US residents appear to control three-quarters of Canada's petroleum industry, a similar amount of the mining and smelting industries and about half the manufacturing industries. UK investment, although higher in 1930 at \$1.05 billion, rose only to \$2.7 billion in 1956. A 25-year survey indicates, moreover, that US ownership in chemical and allied products has risen from \$89 million in 1930 to \$307 million in 1955.

There has been perhaps too little realisation of Canada's reliance on foreign capital. A recent Canadian Bank comment suggested that Canada depended on foreign capital for roughly one-third of its net capital formation, but it was really left to Canadian Prime Minister, Mr. John Diefenbaker and the Canadian elections to emphasise this dependence.

Mr. Cook's article reveals that most of the foreign-financed concerns operating in Canada are US-controlled. In manufacturing about 25 US-controlled companies with aggregate investments of \$25 million each account for more than half of the investment in US controlled plants in Canada. Concerns with an investment of \$1 million or more make up more than 90 per cent of US-controlled establishments in manufacturing. At the same time, the large companies are stated to account for 30 per cent of Canadian manufacturing production and 21 per cent of employment in that field.

US ownership and control has undoubtedly laid down the development of Canada's commercial policy, whereby the emphasis has been on export trade, to the disadvantage of domestic needs.

Demands resulting from investment activity are seen to have contributed directly and indirectly to a rise in imports, and such has been the rise that

it has outpaced the large expansion in Canada's export capacity.

The present trend in Canada is forseen as a change over from exporting raw and semi-processed resources to considerably increased domestic manufacturing.

Canada's natural resources have naturally attracted world attention and in particular the attention of her great neighbour, the US. By this Canada has gained industrial techniques of more highly developed countries in a shorter time than would otherwise have been possible. At the same time, however, control from outside Canada has restricted to some extent the growth of domestic Canadian companies or subsidiaries. It has been shown also that foreign investment in Canadian industry has been undertaken in order to gain participation in the Canadian market, either domestic or export, as advantage can be taken of tariff preferences for Canadian-made goods among British Commonwealth countries. Even geographical conditions have governed foreign-investment in Canada.

It is known also that Canadian subsidiaries have been set up to provide a parent company with a wholly-owned source of raw materials. In such circumstances, there is a tight control by the parent company. Mention has been

made recently that Canadian research and development is lagging and is at a disadvantage. Again, domination of the Canadian chemical industry by parent companies in the US or UK has had an effect on research and development in Canada. Parents of the Canadian companies all spend large sums on research and development, far in excess of those that can be afforded by the Canadian subsidiary. The products of US or UK research are brought into Canada and a market is built up sufficient to support a minimum-sized economic manufacturing unit.

The Canadian chemical producer with a completely new product has tended to find Canada rather barren ground with the result that the product may well be offered to the US or UK. The result of Canadian research and pilot plant work has been known to result in a commercial plant being built in the US and not in Canada.

On the other hand, such a situation could prove advantageous to the hard-pressed highly-taxed British chemical producer, with interests in a subsidiary in Canada, for if research and pilot plant work is undertaken in Canada, advantage can be taken of the provision in the Canadian Income Tax Act which allows 5 per cent of net income to be used for research and development before calculation of tax.

BORANE PROCESSING

IN the 31 May issue of *CHEMICAL AGE*, Olin Mathieson's new \$4½ million Navy plant for borane processing was described. US press visits together with other already known information have produced a clearer idea of the details of the processes employed.

From reports available and in particular to a special write-up in *Chemical Week* (24 May, 1958, p. 61), it appears that sodium boride produced at Metal Hydrides' Navy plant in Massachusetts is despatched to the Olin Mathieson plant in drums. The borohydride is loaded into a kettle, where it is slurried with toluene. Alongside this kettle is a smaller one containing aluminium trichloride slurried with toluene. Both slurries are placed in a reactor where boron trichloride, obtained by tank car from Stauffer's plant nearby is reduced to diborane. The aluminium trichloride, it is learned, makes possible good yields. US investigation work has shown that aluminium trichloride enhances the selectivity of sodium borohydride as a reducing agent.

The diborane obtained is pyrolysed to pentaborane which is then alkylated to form HEF-2. *Chemical Week* believe from their on-the-spot observations that this alkylation step is an ethylation, carried out by reacting the pentaborane

with a chlorinated hydrocarbon (possibly ethyl chloride) in the presence of a ferric chloride catalyst. Callery, however, will use an alternative to alkylating the pentaborane, tacking the alkyl group on diborane. At their \$38 million plant now being constructed for the Navy, it is considered likely that ethylene produced from ethanol in a Foster-Wheeler-built plant, will be used.

It is reported that Olin Mathieson although knowledgeable about the Callery process, prefer alkylation of the higher borane. It is presumed that in OM's new \$45 million plant now being built for the US Air Force for production of HEF-3 (alkylated decaborane) the same approach is likely to be used. In support of this is the information that US producers of ethyl chloride are now preparing bids to supply this plant which is expected to require, when fully operating, about 3 million lb. a year. The only difference expected is the use of lithium hydride instead of the sodium borohydride now being used in present plants.

With regard to the finished fuels, these are still very much a matter of speculation. Tri-ethyl boranes are suggested with higher members in the series (e.g. HEF-5) being higher alkyl substituents (e.g. butyl).

TOXICITY OF TBA

Toxicity of trichlorobenzoic acid (TBA), a recently developed additive to existing MCPA weedkillers to kill or control hormone resistant weeds, can exist in several isomeric forms of varying herbicidal activity (*The Lancet*, 31 May, p. 1181). Their acute oral toxicity in laboratory animal species is low, LD₅₀ values ranging from 300–500 mg. per kg. depending on species, compared with 25–80 mg. per kg. for DNC. The most herbicidal isomers are among the least toxic to mammals. The oral LD₅₀ of TBA in the pheasant is about 1 g. per kg. and in the hen over 1.5 g. per kg. Percutaneous toxicity in the rat is extremely low; 1,000 mg. per kg. applied for 20 hours under an impermeable covering, caused no toxic effects.

In all, 14 isomers of di-, tri-, and tetra-chlorobenzoic acids have been examined, says E. F. Edson (Chesterford Park Research Station), and all had low toxicity in mammals. Their presence as manufacturing impurities would therefore not decrease the safety of TBA in agricultural use.

These isomers differ not only in their mammalian toxicity

but also in their apparent mode of toxic action. Some caused an unusual 'myotonic' effect even at non-lethal doses, the animals showing transient but severe muscular rigidity on handling. Other isomers failed to produce such myotonic effects even at lethal doses.

Laboratory investigations are not always a reliable indication of risks in the field. Observations made during 1956–57 trials, when more than 4,000 acres were treated with various TBA mixtures, support the implication that TBA is virtually non-hazardous in use.

The problem of selective weedkilling in farm crops is still a long way from solved. It is still necessary to use the toxic dinitro-herbicides for weed control in some pea crops, or where cereals are undersown with clover. It is, however, encouraging when a new development, such as TBA, combines the virtues of effectiveness and every promise of safety in use.

RESEARCH PROGRESS AT 39 GRANT-AIDED INDUSTRIAL RAs

PROGRESS made by the 39 grant-aided industrial research associations in the Government scheme during the 15 months ended 30 December 1957 in a few important lines of research are recorded in the report *Research for Industry*, 1956-57, published by HMSO price 7s 6d net. Previously this summary of work was included in the *Annual Report of DSIR*. The associations serve industries as diverse as baking, printing, hosiery and marine turbines.

The British Gelatine and Glue Research Association has further investigated the emulsion-stabilising power of gelatine and glue. It is reported that for purified oils, or mineral oils, the variation in emulsifying power is not great and is largely related to the physical properties (e.g. molecular weight) of the gelatine or glue used. With some crude oils, some emulsions cannot be prepared with certain gelatines and glues. This lack of stability has been traced to interaction between calcium ions from the glue and phosphatides from the crude oil. Removal of either calcium or phosphatide immediately makes possible, it is recorded, preparation of a stable emulsion. These results enable the preparation of emulsions with gelatine or glue as a stabiliser to be made on a more national basis.

Attention is now being directed by this association to a comprehensive programme on non-gelatine constituents of gelatine and glue. In the first instance, investigation is being made of a lipid-protein-polysaccharide complex isolated from bone glue.

BGIRA Studies Detergent-Treated Glass

Effects of treating glass with detergents are under study by the British Glass Industry Research Association. This association has been carrying out tests with a wide range of detergents under conditions such as severe sterilising or washing (as in the pharmaceutical field). It appears that some detergents and germicidal solutions can cause damage to glass surfaces.

In view of the shortage in 1956-57 of selenium, used in decolorising glass, this association made a series of investigations to determine whether other materials could provide satisfactory alternatives. Both laboratory-scale and small works-scale melts were carried out using nickel oxide instead of selenium and glassware of 'saleable' quality was produced during works-scale trials.

A pilot line for continuously laminating a thin film of p.v.c. to sheet steel or strip is now operating at the British Iron and Steel Research Association's South Wales Coatings Laboratories at Swansea, using a process developed there. The BISRA process (patent applied for) produces a material with properties which, for several

uses, are stated to be superior to a similar US product.

'Peel strength' of the film is up to 30 lb. per inch with plastics films about 0.01 in. thick. Samples of the laminate, which is called Plasteel, have been successfully bent, sheared, lock-steamed, roller-formed into sections, and deep drawn into cups 1½ in. in diameter and up to 2 in. deep without causing any damage to the coating. An apparently unique property of laminate made by the Plasteel process is that cups drawn from laminate can be immersed in boiling water for an hour or more without failure of the adhesion occurring anywhere on the cup. A cup of Plasteel, the report states, will even withstand immersion in glycerine at 200°C for a few minutes without any failure of adhesion taking place, although some darkening of the plastics material occurs due to partial decomposition at this high temperature.

CTRA Work on Tar Acids Extraction

Work on the extraction of tar acids was carried out during 1956-57 by the Coal Tar Research Association. Phenol extraction involving four unit processes has been under investigation for the purpose of gaining a general idea of the effects of variations in reaction conditions and to establish means for assessing the efficiency of industrial plant.

The investigations have shown that in the extraction stage with 2N caustic soda, there is no benefit to be gained in operating at a temperature higher than that necessary to maintain the oil in a liquid condition; at higher temperature more neutral oils are extracted with the phenols. In the purification stage the amount of phenols lost is increased in proportion to the time of steaming and the temperature, but can be reduced in the presence of excess alkali. Absorption of CO₂ by aqueous solutions of sodium phenate is liquid film controlled; rate of springing increases both with temperature and with CO₂ content of the gas. Rate of causticisation and rate of settling of lime-mud have been found to depend on the nature of the lime used, hard burnt lime being less reactive but giving a more rapidly settling precipitate than 'soft burnt' lime. With regard to settling time and filter ability of the lime-mud the most important factor is the nature of the impurities such as dihydric phenols in the sodium carbonate solution.

Tests, etc., evolved for assessing efficiency of contacting in industrial extraction and springing towers to determine quality of the lime used in recausticising and for determining the settling rate and filter ability of 'lime-muds' are now being used to survey the efficiency of present plant and operation.

Naphthalene recovery has also been

investigated. Vapour-liquid equilibria for naphthalene oils have been determined from which the plate efficiencies of continuous distillation columns for the production of naphthalene of a specified purity in a specified yield can be calculated. In general, stirring during cooling improves naphthalene quality. For each oil there appears to be a critical rate of cooling above which the purity of the crystals produced falls off considerably. This critical rate has been found to be higher for richer oils and appears to be higher for oils derived from continuous vertical-retort tar than from those derived from coke-oven tar.

Three new processes have been under development by CTRA. As has been announced (CHEMICAL AGE, 3 August 1957, p. 321, 7 December 1957, p. 920) the process for hydro-refining of coal tar benzoles and naphthas is to be developed commercially by Newton Chambers and Co. Ltd. CTRA state in their report that if adopted by the tar industry—even if only for refining of naphthas—the saving resulting would be of the order of £100,000 per annum.

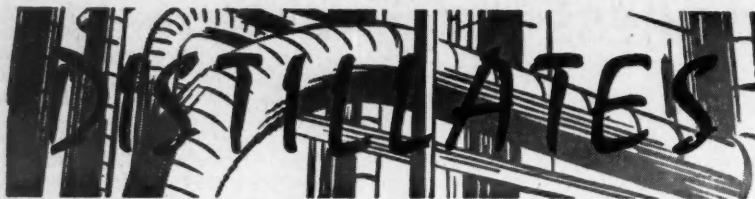
Oxidation of Naphthalene to Phthalic Anhydride

The second new process which has passed the laboratory pilot-plant scale is the CTRA process for oxidation of naphthalene of any purity to phthalic anhydride (see CHEMICAL AGE, 19 October 1957, p. 638). An acceptable method has been evolved for full-scale manufacture of the special catalyst required. A large pilot plant embodying a 2-ft. diameter reactor has been erected.

Extraction of phenol from tar oils by an acidified aqueous solution of pyridine base sulphate followed by the recovery of phenols by treatment of the base sulphate with diisopropyl ether is the third process. Under optimum conditions, CTRA states, this process recovers over 90 per cent of the phenol in the oil, containing only 0.18 per cent basic material and 0.35 per cent neutral oils. On the laboratory scale, due in the main to handling loss and losses on solvent recovery, the loss of diisopropyl ether is reported as being uneconomically high but this loss should be much less on a commercial scale, it is considered. The possibility of avoiding the use of solvent in phenol recovery is under investigation.

Other work on the utilisation of tar products has involved studies of the dealkylation of coal tar over charcoal catalysts with particular emphasis on the production of pure benzene and toluene from coke oven naphthas. Rapid catalyst deterioration experienced in this process is suggested as being mainly due to the presence of dicyclic aromatics in the feed-stocks.

In conjunction with the Ministry of Supply, investigations are in hand for high melting dielectric materials. Copolymerisation of acenaphthene and butadiene has been found to yield copolymers with softening point about 200°C, but the maximum softening point of products with end impact resistance equal to that of polystyrene (about 125°C).



★ WHEN I showed a preference for 'polythene' over 'polyethylene' the 'polyethylene' protagonists complained; since my note of May 3 in which I plumped for 'polyethylene,' **CHEMICAL AGE** has been inundated with protests from the 'polythene' camp. In fact a letter from the ICI plastics division home sales director appears in page 1153.

On my desk is a letter from another reader who refers to a publicity war to try and remove the word 'polythene' from our day-to-day vocabulary and 'to remove it from use in the country where both the material and the word were invented.' He then says that no plastics material is 'polyethylene' because 'however it is made, by high pressure or low pressure, this catalyst or that catalyst, there are always a few sidechains which pedantically prevent it being called polyethylene.'

The view is that the 'campaign' is a bit of fast work on the part of the American manufacturers. At present the UK producers of the material are divided. Apart from ICI, inventors of 'polythene,' both US and UK-owned producers tend to use 'polyethylene'; in at least one company, senior staff have used both forms. It is of little use if the British Plastics Federation and the British Standards Institution adopt 'polythene' when both industry and science are still divided. To get a wider feeling of opinion on the subject **CHEMICAL AGE** is asking visitors to the CA stand at the Olympia exhibition this week and next to complete a simple ballot form with a cross against their preference. Also announced are two £10 prizes for the best letters from 'polythene' and 'polyethylene' supporters on the reasons for their preference (for full details see p. 1153).

★ CONGRATULATIONS to Negretti and Zambra on their fascinating new booklet 'A Story of Temperature Measurement.' This traces the earliest known demonstrations of the expansion of air due to change in temperature to the physicist and philosopher Philo of Byzantium, thought to have flourished about 200 BC. His instrument, now known as a thermoscope, shows the expansion of air with increase of temperature, but it was not calibrated and could not actually measure temperature.

Practically no further advance towards the evolution of the thermometer was made until the end of the Middle Ages saw a reawakening of the desire for knowledge of science. Foremost among the great experimenters of this time was Galileo, who about 1592 devised an air-thermometer which he used to investi-

gate degrees of heat and cold. Between 1611 and 1624 Sanctorius applied an instrument which detected changes in temperature to his physiological researches at Padua University.

I have not room to describe other early work in this field, but the booklet traces the history of the thermometer from 150 BC to the modern precision instrument now used for highly specialised purposes in industry.

★ I AM GLAD to see that Mr. J. Tough, general sales manager of the Chance-Pilkington Optical Works, has been swift to refute the claim of Schott of Mainz made at the Achema exhibition, to have been the first in the world to solve the problem of producing gamma-proof glass.

Writing in *The Financial Times* last week, Mr. Tough says that the first radiation shielding glasses produced in the world, including the lead glass types, were made in England in 1950 by the optical division of Chance Brothers. Since 1950 his company has been supplying these shielding glasses to atomic and nuclear energy establishments, to research establishments and hospitals in Britain, Norway, Sweden, Denmark, France, Belgium, Germany and to Commonwealth countries.

★ AN INTERESTING assessment of the potential European market in chemicals is made in the March issue of *Die Basf*, the magazine of Badische Anilin-und-Soda Fabrik. It is stated that BASF had a turnover of DM 1,261 million in 1955, or about 10 per cent of the total chemical production in West Germany, which is estimated at DM13,000 million. At present West Germany takes about 65 per cent of BASF output.

Chemical production of the six common market countries in 1955 is given as about DM34,000 million; those nations take about 72 per cent of BASF output. Taking the much wider territory covered by the proposed European free trade area, it is estimated that its chemical industry output was worth about DM53,000 million in 1955. BASF now sells about 80 per cent of production in the FTA.

Next to be considered were the two areas with the greatest chemical potentialities in the world—the US and the USSR. US chemical production is valued at about DM97,000 million. In proportion to population, the US chemical industry is said to be two to three times larger than that of the old world. Most of US output, however, is sold in the country

itself. Chemical output of the Soviet Union is estimated at DM30,000 million. This does not include Communist China or the eastern bloc countries.

I agree with the view that these figures show how necessary it is to create in West Europe a major unified industrial area such as the free trade area, which can exist as part of the free world beside the US and the rising chemical productive capacity of the Communist countries.

★ NEGOTIATIONS for Italian-Austrian co-operation in the setting up of a petrochemical company in Austria appear to have reached an impasse due to political considerations. The representatives of Oesterreichische Stickstoffwerke, Linz, and Montecatini have suggested each should contribute 40 per cent of the 300 million Austrian shillings required. The remainder was to have been subscribed for by private Austrian investors.

The new company is to be called Danubia AG. It is now believed that Hoechst of Germany would like to take part in the project with the Austrian organisation. If adopted, this would, of course, lead to their replacing Montecatini.

★ THIS year the 86-year-old Mr. J. ARTHUR REAVELL, M.I.Mech.E., M.I.Chem.E., F.Inst.F., F.I.M., celebrates his 50th year as chairman of the company he founded, with a secretary and an engineer, in 1908, the Kestner Evaporator and Engineering Co. Ltd. Today it has branches in South Africa and Australia and agents all over the world. Those 50 years have been ones of successful and hard work during a period of phenomenal development in chemical engineering, in which he has played his full part, technically and in the fostering of chemical engineering education and the founding of chemical engineering organisations, particularly the Institution of Chemical Engineers, of which he is a founder and a past president.

Mr. Reavell's early ambition was to be a chemist, but parental guidance put him as a student apprentice to a firm of electrical engineers. He acquired experience with many mechanical engineering firms in this country and elsewhere. That experience brought him closer to his original bent since the firms concerned had interests in sugar plant and the then embryo chemical and allied industries. An early friend was Paul Kestner, the French physicist.

In 1908 he embraced Kestner's proposition of taking over the Empire rights in Kestner's climbing film evaporator and other plant patents. To those patents he has since added a long string of his own.

Mr. Reavell, who is at his office or works most days of the week, and who each year visits the overseas branches, tells me, 'I have lived a full life and I intend to go on doing the same'.

Alembic

CA Offers £20 for Readers' Views on 'Polythene' or 'Polyethylene'

'Chemical Age' has received so much correspondence on the question of whether 'polythene' or 'polyethylene' should be used when referring to this polymer that we have decided to put this question to the vote. Prominently displayed on 'Chemical Age' stand (No. 4, Inner Row, Grand Hall Gallery) at the Chemical and Petroleum Engineering Exhibition is a special ballot box. Voting slips are provided so that visitors can indicate their preference. Readers who do not intend to visit the exhibition are invited to send their votes direct to the editor at 154 Fleet Street, London EC4.

In addition readers are invited to submit their reasons for preferring either 'polythene' or 'polyethylene' to Chemical Age office at the above address. In the case of each word, two prizes of £10 each will be awarded for what are adjudged to be the best reasons submitted. A selection of other reasons will be published in Chemical Age; those published will earn the senders £1 1s each.

What an ICI Plastics Director Thinks

SIR, My attention has been drawn to your issue of 3 May 1958, No. 2025, and the first paragraph of page 828 under the heading 'Distillates'.

May I point out that the name polythene was never a registered trade name of any company, but was the first generic name adopted in Great Britain for the polymers of ethylene, now sometimes described as polyethylene. In view of the fact that polythene is an entirely British invention, and that almost all manufacturers in other parts of the world have been, or still are, licensees of the original patentees, it would be a pity if the original British name should not continue to be used. I see no reason whatever why this country should adopt a name which has been taken up by American producers, and in many cases incorporated in their trade name for the product. Moreover, there is no doubt that polythene is the more attractive word, and it has recently been agreed by the British Plastics Federation that it is to be preferred as the generic term to polyethylene.

May I suggest to you that the 'weight of opinion' in this country is heavily in one direction.

Yours, etc.,

J. V. CROSSLEY,

Plastics Division Home Sales Director.
Imperial Chemical Industries Ltd.
Welwyn Garden City.

Terylene as Filtration Medium

A new edition of 'Terylene for Filtration' has been published by the fibres division of Imperial Chemical Industries Ltd., Hookstone Road, Harrogate, Yorks. This describes the chemical and physical properties of Terylene which, it is claimed, make it suitable for the handling of a large range of materials.

SOVIET TEAM TO VISIT OLYMPIA EXHIBITION

A TEAM of Russian technologists is visiting the Chemical and Petroleum Engineering Exhibition (Olympia, 18 to 28 June). They are Mr. Kamenski, Mr. Petrovsesich, Mr. Nakhimoss and Mr. Starikof.

Their visit has aroused much speculation at Olympia as to where their interest will be and whether they are bringing their order books.

According to Dr. E. H. T. Hoblyn, director, British Chemical Plant Manufacturers' Association, the Russians are still very interested in buying chemical plant from the UK.

Questions are being asked about the three synthetic fibre plants for which a contract was recently signed in Moscow by Mr. Henry von Kohorn, president, Von Kohorn International Corporation, New York, and Mr. Alexander Smirnov, deputy head of the Soviet state buying corporation.

Baker Perkins, Peterborough, and the APV Co., Crawley, will manufacture equipment for this project. Technical advice will be given by Von Kohorn. Delivery date will be towards the end of 1959 or the beginning of 1960.

It is thought that this represents the first of a number of USSR orders in the synthetic fibres and chemical fields.

Official Opening

The exhibition was officially opened on Wednesday by Sir David Eccles, President, Board of Trade. At a reception, Mr. H. W. Fender, chairman, British Chemical Plant Manufacturers' Association, said: 'Between 1948 and 1957 the capital expenditure of the British chemical industry was of the order of £700 million and, although all this was not, of course, spent on plant, the figure does give some measure of the chemical plant industry's effort.'

'To all this should be added a notable contribution in the export field. This has embraced not only a great volume of individual items of plant but some outstanding examples of British contracting. One may quote, for example, the 1,000 ton-a-day nitrogenous fertiliser plant at Sindri in India, sulphuric acid plants in Australia, New Zealand and Mexico, complete soap works in Malaya and the Belgian Congo, a polystyrene plant in Poland, two superphosphate plants in New Zealand and large pharmaceutical installations for the Government of Burma.'

'In all this the industry has clearly demonstrated its contracting ability, its designing competence and its fabricating skill; it is fitting, therefore, that it should, jointly with the Council of British Manufacturers of Petroleum Equipment be sponsoring this very fine exhibition, which I feel is thoroughly worthy of the industry and of the primary technology of chemical engineering upon which it depends. What has impressed and pleased me is that there is so much in this exhibition that is either

new or being exhibited in Britain for the first time. That makes the exhibition exciting—all too often it is difficult to find anything really new at an exhibition; I am sure that you will not be able to level that accusation at this exhibition'.

Developments since World War II were also mentioned by Mr. G. H. Thorne (Dawnays Ltd.), chairman, Council of British Manufacturers of Petroleum Equipment, who are joint sponsors of the exhibition.

'The petroleum equipment industry is virtually a post-war growth, said Mr. Thorne, 'and what an astounding growth it has been. For example, no less than £558 million worth of petroleum equipment has been purchased in this country for the 5-year period 1953-1957, and the rate of growth is still increasing'.

The figure of £558 million only represented orders for oil companies with permanent offices in this country, and excluded, for example, sea-going tankers, and all orders for petroleum companies permanently domiciled outside the UK.

Last week, CHEMICAL AGE published a 20-page preview dealing largely with new developments shown at the exhibition, and a plan and comprehensive list of exhibitors.

Visitors are invited to call on the 'Chemical Age' stand, No. 4, Inner Row, Grand Hall Gallery, where the seating facilities can be used for rest or to meet friends.

Investment Aid to Industry Announced

INITIAL allowances for plant, machinery and industrial building are to be raised by a half in the Finance Bill, instead of the quarter announced by the Chancellor of the Exchequer in his Budget speech. This new concession will double the cost of the original relief to £32 million next year and £46 million in a full year.

The effect will be to raise initial allowances to 30 per cent for plant and machinery and to 15 per cent for industrial building. Prior to the Budget the allowances were respectively 20 per cent and 10 per cent.

Carbon Dioxide Poisoning Cause of ICI Man's Death

An inquest on Frank Lyon, aged 57, process worker, of 83 Heath Road, Runcorn, who was found collapsed in Imperial Chemical Industries Ltd., Randle Works, Runcorn, on 7 June was adjourned at Runcorn on 12 June until 20 June. Mr. Clarence Bridges, an ICI analytical chemist, gave evidence of tests he had carried out in the atmosphere in pits at Randle Works. He said he found the carbon dioxide in the air registered between 32 and 36 per cent. The normal level would be about 2 per cent. Dr. D. B. Mossman said death was due to cardiac and respiratory failure following carbon dioxide poisoning. Lyon had been a perfectly healthy man without any organic diseases.

INDUSTRY AID HELPS SAC SPEED WORK OF ANALYTICAL METHODS COMMITTEE

QUICKER progress all round is reported in the report of the Analytical Methods Committee (1957) of the Society for Analytical Chemistry, since the Appeal to Industry was made to put the committee on a sound financial basis. The advantage gained thereby is the more rapid progress of work by the Joint Committee on Methods for the Analysis of Trade Effluents set up by the Society and the Association of British Chemical Manufacturers in 1954. All five panels of the joint committee are actively engaged in experimental work.

The SAC's first research scholar, Mr. T. T. Gorsuch, whose work has entailed research into the application of radiochemistry to the specific problem of losses occurring during preparation of organic materials for trace element analysis, and to various problems which have confronted the Metallic Impurities in Organic Matter Sub-Committee in its work, will shortly complete his studies and an account will be published in the near future.

Research is also being carried out under the direction of Dr. H. M. N. H. Irving at Oxford, to devise a method for the determination of traces of silver in the presence of organic matter.

Metallic Impurities

The Metallic Impurities in Organic Matter Sub-Committee have concluded that the use of perchloric acid in the preliminary treatment of organic matter containing metals should be encouraged. Investigations into the molybdenum-blue method for the determination of arsenic are reported as being in the final stage. A report on the work and on the method is in preparation. Experimental work on the revised method for lead has been completed and a final report should be approved shortly. The determination of arsenic (Gutzeit method) has been revised and approved for publication; those for copper and lead are considered out of date.

Manipulative details of a procedure for the differential micro-analysis of tocopherols in natural oils and in complex samples, such as poultry meals, have engaged the attention of the Vitamin E panel. The method involves a paper chromatographic separation of the tocopherols, after purification, followed by their individual assay by a modification of the Emmerie-Engel colorimetric method. Although a considerable amount of manipulative skill is required, the panel is of the opinion that the method has many advantages. It is hoped that final recommendations will be published soon as a report.

In the report of the Pharmaceutical Society/SAC Joint Committee on Methods of Assay of Crude Drugs, members of panel I, who

are studying chemical methods for the assay of digitalis and its preparations, have found that determinations of the glycoside content by several chemical methods yielded good agreements but that these show no correlation with the biological assay. As it appears that several glycosides are responsible for the total activity of the drug and others are inactive, methods involving chromatographic separation and estimation of the total primary glycosides, are now being studied.

Two alternative procedures for the isolation of capsaicin, one chromatographic and the other by alkali extraction, after which the capsaicin content is calculated directly from the extinction value, have

In Parliament

US Process Tie-ups Likely to Hinder UK Trade with Communist Bloc

A MOTION calling for the relaxation of artificial barriers in trading relations between communist and non-communist countries was moved and resolved in the House of Commons on 13 June.

Moving the resolution, Dr. Horace King said that the UK imported twice as much from the communist countries as it exported to them. Chemicals were freed from embargo in June, 1957. At once the export figure of chemicals to China doubled. In 1956 the UK exported \$3 million worth of chemicals to China, compared with \$27 million from West Germany and \$15 million from Belgium.

Mr. Harold Wilson said that the Soviet authorities had indicated that they wanted to place some vast orders for chemical plant, namely in the oil chemical field. 'I should not be surprised if those orders added up to a total of £150 million.

'But a very serious difficulty has arisen. In nearly every case . . . the process depends on US patents. Therefore . . . the whole process is dependent perhaps on one part of the plan involving an American patent. In many cases the American companies would like to co-operate, but when they have been to their own Government departments they have been told that they may not for political reasons. In one case the answer specifically related to the question of the negotiations for summit talks.

'Owing to this attitude, this country is in danger of losing orders adding up to £100 or £150 million, because the Russians are going to buy and the Germans are supplying them. The Germans have no inhibitions of this kind.'

Mr. Wilson went on to say that the Chinese wanted certain types of chem-

icals, especially reagents. been examined by Panel 2 of the PS/SAC Joint Committee. A confirmatory colorimetric method, after considerable modification has also been found to be acceptable. It is not sufficiently accurate, however, to quote an extinction value for the coloured capsaicin complex and it is necessary to prepare a standard absorption curve at the same time as the test.

Good progress is reported by Panel 4 dealing with methods of assay for rauwolfia and its preparations, in their investigations of one of two published methods, namely, a colorimetric method. Preliminary exploratory work on the ultra-violet absorption characteristics of reserpine and rescinnamine and of the acids produced as decomposition products has shown that the second method is basically unsound because of the rapid deterioration of one of the acids when exposed to light. The cause of this deterioration is now being studied.

In view of the considerable work undertaken and the potential value of the committee's work to industry, the committee hope that the support given by industry will continue.

icals, especially reagents.

Mr. Ian Mikardo described a discussion in *The Financial Times* on what he called the battle between, on the one hand, those who wanted to liberalise, including in many cases the UK Government, and the US on the other hand. Plastics and synthetic rubber had been the subject of heated discussion and substantial relaxation was apparently still opposed by the US. The same thing applied to non-ferrous metals.

Speaking for the Government, Mr. D. Ormsby-Gore, Minister of State for Foreign Affairs, said that the motion generally reflected the views of Her Majesty's Government and they would, of course, accept it.

The Government and Coal Gasification

When the Paymaster-General, Sir Ian Horobin, was asked what research he was promoting in regard to the high pressure gasification of coal, and did he appreciate the tremendous scope for the gas industry if research could be speeded up referred to the first commercial scale high pressure coal gasifier about to be built by the Scottish Gas Board at Westfield, Fife, and the North Western Gas Board's commercial plant at Partington now being constructed which will employ another type of high pressure gasifier using oil initially and later coal.

The Ministry also hopes to complete within the next few months a new experimental high pressure gasifier for research purposes, and parallel work on gasification is being carried on by the British Coal Utilisation Research Association on the Ministry's behalf.

RECORD FRANKFURT ACHEMA

Strong UK Instrument Contingent at Congress and Exhibition

OVER three-quarters of a million square feet of display space was used by about 1,000 exhibitors at the 12th Chemical Engineering Exhibition and Congress (ACHEMA) held in Frankfurt, Germany, from 31 May to 8 June. Of over 6,000 to 8,000 visiting members of the congress, more than half came from abroad, and of the exhibitors more than 150 companies came from 14 countries. This was a 50 per cent increase over the foreign exhibitors at ACHEMA 1955. In addition, between 50,000 and 60,000 visitors who were not registered members of the congress are believed to have attended.

A technical programme of 232 papers was arranged under the auspices of societies representing 18 different countries. This programme began in Brussels on 28 May (see 'Chemical Age', 7 June, p. 1027). The Brussels group then travelled to Frankfurt for further technical meetings and for the ACHEMA exhibition.

Seven societies co-operated in the Frankfurt sessions. 'Nuclear science and technology' was the theme of the annual meeting of the DECHEMA, the German Society of Chemical Engineering. Eighteen plenary lectures were followed by discussions. Six plenary lectures headed the programme of the 2nd Congress of the European Federation of Chemical Engineering, which were followed by lectures and discussions by scientists and technologists from eight countries.

An extensive programme was arranged by the European Federation for Corrosion, the Society for the Study of Isotopes, the Gesellschaft Deutsche Chemiker and the

Deutsche Gesellschaft für Arbeitsschutz.

There were also plant and laboratory inspection trips and a number of social events.

Professor Dr. Ludwig Erhard, Federal Minister for Commerce, acting as the representative of the Federal Chancellor, Dr. G. A. Zuin, Prime Minister of Hesse and Herr Werner Brockelmann, the Lord Mayor of Frankfurt, took part in the official opening session of the congress. Official address at the opening ceremony was delivered by Professor L. Biermann (Göttingen), who took as his theme 'Electronic calculations in science, technology and commerce'.

systems and vacuum apparatus. A leak as small as 1/50 of an ounce of hydrogen per year can be easily located.

In conjunction with their German associate, Lonfra Handelsgesellschaft, GmbH., Frankfurt, *Evans Electroelenium Ltd.*, Halstead, Essex, featured the EEL flame photometer, a self-contained instrument for the accurate quantitative detection of alkali metals. One measurement per minute, it is stated, can be made with this sensitive, and simple instrument. Readings are claimed to be steady and reproducible within ± 1 per cent.

The latest development in EEL instrumentation shown was the EEL oil-filled galvanometer. The movement has been totally immersed in pure silicone oil, so that even if hit with a hammer it could still record an accurate reading.

A last minute 'air lift' of equipment was sent to the exhibition by *Fleming Radio (Developments) Ltd.*, Stevenage, at the request of their German agent. The German company, *Siltra GmbH.*, were so interested in this equipment that they were showing it on their own stand. The instruments were: A standard radioactive dust sampling equipment, type 1355, which is a comprehensive set of health instruments for air, personal and bench monitoring; the new air pollution meter; and the new pocket radiation monitor, type PM58, which is the fully tooled production version of the hand-made prototypes first shown at Interkama.

The most interesting items on the stand of *A. Gallenkamp and Co. Ltd.*, London EC2, were a new range of ovens and incubators with stainless-steel interiors performance to BS 2648. Also shown was the Compensat. The scale of this thermostat is claimed to give a true temperature reading and it is fully compensated for changes in ambient temperature, thus avoiding drift of oven temperature.

Hilger Show New Fluorite Polychromator

Hilger and Watts Ltd., London NW1, had two stands, one of which dealt with analytical instruments and the other with X-ray diffraction and analytical equipment.

On display was the Hilger and Watts Fluorite Polychromator, or CPS evaluator, a new instrument and the first British-designed and British-made equipment of its kind. Designed specifically for the steel industry it determines the amount of carbon, sulphur and phosphorus in a sample. The first of one to be installed on the Continent, and believed to be the first of any kind to be in operation in Germany, is now working at Phoenix Rheinrohr, Düsseldorf.

Another major exhibit was the most recent development of the automatic direct-reading multi-element spectrograph, known as the triple medium. Designed primarily for use in the non-ferrous industry, it will analyse up to 24 elements in a metal on pre-set programmes and also offers the additional facility of providing a

SIMA Members Show New Instruments

FORMING an important part of the British participation at Achema were a team of members of SIMA (Scientific Instrument Manufacturers' Association of Great Britain). Several of the UK electronic, nucleonic and optical developments are not available from other sources, and embody unique features not to be found in instruments made in Europe, including Germany, or the US.

The SIMA exhibitors were as follows:

Baird and Tatlock (London) Ltd., Chadwell Heath, who had a display devoted to Analmatic equipment, the exhibits having been chosen to illustrate the wide range of new applications developed since their equipment was introduced in 1955. The exhibits had been seen individually at various exhibitions in the UK.

US visitors had their own preview of the Analmatic system which is due to be marketed in the US this autumn by Chicago Apparatus Inc.

C. Baker of Holborn Ltd., Croydon, had the courage to take microscopes to Germany. They decided to do so because they had two instruments that were unique in design; it is believed that no precise equivalents are made outside Britain.

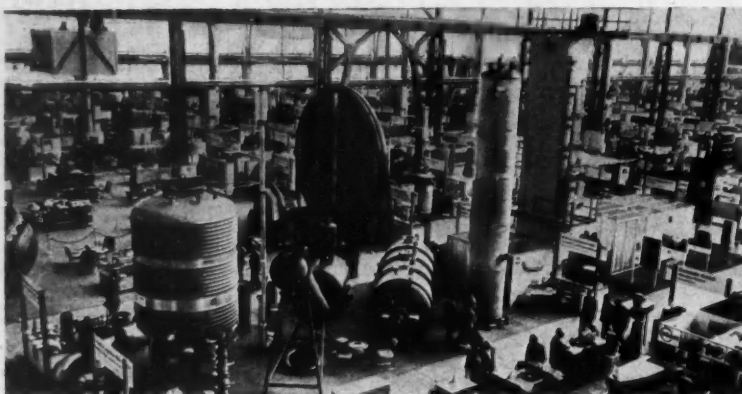
The first is designed for transmitted light and enables very small phase changes caused by a specimen to be seen and measured. The instrument also makes

visible specimens which do not absorb light and would otherwise be invisible without staining. With suitable accessory equipment phase changes of as little as $\lambda/200$ can be measured. From these measurements of any change of optical thickness, protein concentration in living cells can be deduced and other important information derived. The second Baker interference microscope is for opaque objects and measures deviations from a perfect surface finish. This model is used in a range of research fields where surface finish phenomena are important. It can be used on any reflective surface either metal or dielectric. Faults of surface finish as small as 1 micro inch can be measured.

Exhibits by *Dave Instruments Ltd.*, London W5, included type 1408 sound level indicator which provides a simple means of determining sound level.

The stand of *Edwards High Vacuum Ltd.*, Crawley, was manned by research staff from Crawley, together with some of the staff from their new German company, *Edwards Hochvakuum GmbH.*, Lilienthalallee 4, Frankfurt am Main W13. Among exhibits was a series of the new Speedivac quiet-running rotary vacuum pumps (see *CHEMICAL AGE*, 14 June, p. 1094).

Exhibited for the first time abroad was the GDI leak detector, described as a highly sensitive instrument applicable to both outward leakage from pressure



View of Hall 3 at Achema

photograph of the spectrum being taken in special investigations.

On the X-ray side there was a new X-ray spectrograph. This instrument enables a very small sample of material to be analysed and the results produced in the form of a graph which is, in effect, an instrumental profile of the constituents in the sample. This profile enables anyone to decide what the sample is and what is in it.

Isotope Developments Ltd., Aldermaston Wharf, Berks, displayed their products on the stand of Sunvic Regler GmbH. The exhibits included scanning unit type 701, portable level detector type 890, gamma switch type 656, and scintillation counter type 700.

Practically the whole range of centrifuges, the atomix and homogeniser, the C and P ultra microtome, the MSE microtome knife sharpener and a new soil grinder were exhibited by *Measuring and Scientific Equipment Ltd.*, London SW1. Included in the range of centrifuges was the new basket centrifuge, model 3,000, and the large angle centrifuge, model 250.

A number of new models were also noted. There was the super-magnum centrifuge

in its final version which incorporated a number of new features and three new machines in the high speed range.

The MSE angle centrifuge, model 250, allows for the use of containers of up to 250-ml. capacity each. MSE basket centrifuge, model 3,000, a machine of 3-litre cake capacity, should prove of particular interest to firms in the chemical and pharmaceutical fields. MSE high speed 10 centrifuge allows maximum speeds up to 10,000 r.p.m. for swing-out and angle sedimentation. The two new models of MSE high speed 17 centrifuges, a refrigerated and non-refrigerated one, have speeds up to 17,000 r.p.m. equal to 33,000 \times g. These machines carry heads allowing the use of 250-ml. containers for the first time at such high speeds.

It was learned that the Stanton Thermo balance has a potentially good market in Germany for there is very little, if any, equivalent competition. This was stated by *Stanton Instruments Ltd.*, London W1. With the Thermo recording balance it is possible to record changes of weight of sample in a furnace against the temperature of the furnace and time.

Pye Show New Argon-Ionisation Detector at Frankfurt

FOLLOWING successful introduction of a prototype model of a new form of detector at the 2nd symposium on gas chromatography held in Amsterdam from 20 to 22 May, *W. G. Pye and Co. Ltd.*, Cambridge, showed the new detector, an argon-ionisation detector, at this exhibition. The detector is stated to have a sensitivity one million times higher than other commercially available instruments to date. These advantages are quoted for it: extremely high sensitivity, therefore smaller sample can be used; with a smaller sample, a better separation is obtained; very good analysis at high speeds; temperature, pressure and flow rate are said to be virtually unimportant for reproducible performance as far as this detector is concerned; complexity of the instrument is reduced and control is simplified; for the majority of samples, calibration is independent of samples; the instrument has a constant sensitivity and therefore calibration for each component in a

mixture is unnecessary.

Other details are: column efficiencies of the order of 1,000 T.E.P. per ft.; no overloading; sensitive part of component in 2×10^8 parts carrier gas (argon) for full scale deflection of recorder. Insertion is simple—a micropipette of 0.1 ml. is provided and other sizes of pipettes down to 0.025 ml. can be supplied. The temperature range is 50°C, 75°C, 100°C, 150°C, 200°C, 225°C and 250°C, which can be held to within $\pm 1.0^\circ\text{C}$. The warm-up rate is 10°C/min. approximately. Column length is 4 ft. \times 4 mm. with a maximum length of 12 ft. The approximate size of the complete instrument will be 30 in. \times 23 in. \times 17 in. The column cabinet weighs 1 cwt. and the recorder and electronic unit cabinet, 1½ cwt.

Pye state that this instrument can be produced at approximately half the cost of other recorders. Production is being increased and delivery by September this year is expected.

Achema Visitors Learn that SD Catalyst Plant is Now Operating

AT ACHEMA, Scientific Design Co. Inc., New York City, US, announced the completion of a new plant in northern New Jersey, especially designed and equipped for the production, on a commercial scale, of catalysts for processes developed by SD. Initially, the plant will make silver catalyst for SD's ethylene oxide process. At the same time it was announced that SD will furnish catalysts for the new General Aniline and Film Corp. plant at Linden, NJ. (60 million lb./yr. of ethylene oxide). Eventually, catalysts for other SD processes and custom catalysts will be made. The plant was designed by SD and was constructed by SD Plants, Inc.

The new venture into catalyst manufacture is under the direction of Dr. Alfred Saffer, assistant vice-president. The SD catalyst was first made in commercial quantities in 1953 under Saffer's direction in co-operation with Naphtachimie in France. Naphtachimie has been manufacturing its own catalyst since 1953. SD has had access to all Naphtachimie's data on catalyst manufacture as well as on catalyst performance in the Naphtachimie ethylene oxide plant since that time.

Versatile New Xylene Route to Aromatic Acids

Scientific Design Co.'s process for making aromatic acids via liquiphase air oxidation of aromatic hydrocarbons will be used at a new plant of Amoco Chemicals Corp. The Amoco plant, now being designed and constructed by SD, will cost an estimated \$10 million, and will be able to turn out a nominal 60 million lb./yr. of phthalic anhydride, isophthalic acid, terephthalic acid, dimethyl terephthalate, dimethyl isophthalic and benzoic acid. It is expected on stream during 1958.

Standard Oil Co. (Ind.), corporate parent of the recently organised Amoco Chemicals, have bought exclusive worldwide rights to the process originated and pilot-planted by SD and its associated companies at their Port Washington (NY) laboratories. SD will serve as Standard's licensing agent for the process in foreign countries.

Distinctive feature of SD's oxidation process (known in the Indiana organisation as the 'MC' process) is its versatility with regard to starting materials as well as to products. The process can start with aromatic hydrocarbons of any composition or purity, and can convert them to the corresponding mono-, di- and polybasic aromatic acids. Specific conditions determine whether to refine the feedstock or the products. Amoco will use a single source of mixed xylenes, and probably separate the mixture of phthalic acid isomers which is produced.

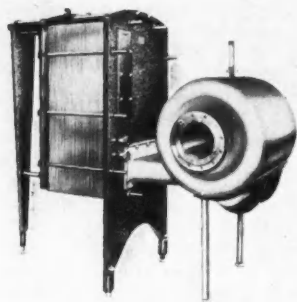
Under present market conditions Amoco will doubtless aim at maximum production of phthalic anhydride and terephthalic acid (or its dimethyl ester). Benzoic acid will be more of a by-product. Whereas phthalic and terephthalic are made in the US to the tune of some 350 million and 50-60 million lb./yr. respectively, sales of benzoic acid, the only commercial aromatic monobasic, amount to less than 1 million lb.

NEW UK DEVELOPMENTS SHOWN AT ACHEMA

Taking part in ACHEMA for the first time were *Albright and Wilson Ltd.*, London. The scope of the company's post-war research and development was emphasised. NTP, A and W's new plasticiser was featured.

APV Show New Plant

A working model, showing the operation of the APV-West Plate used in the APV



New plate evaporator

distillation plant, both continuous and batch, was demonstrated by the *APV Co. Ltd.*, Crawley (see last week's *CHEMICAL AGE*, p. 1096).

Kent Mobile Exhibit

The exhibition vehicle of *George Kent Ltd.*, Luton, Beds, which is touring the Continent, took part in the exhibition. A principal item of interest was the recently introduced Commander K5 high-speed electronic self-balancing temperature recorder. The instrument was shown working with a radiation pyrometer.

Wiggin Display

Corrosion resistant materials were a feature of the stand of *Henry Wiggin and Co. Ltd.*, Birmingham. Two alloys of interest shown were Corronel B and Ni-O-Nel. Corronel B is a nickel-molybdenum-iron alloy which is highly resistant to hydrochloric, phosphoric and sulphuric acids under very severe conditions, as well as to other media such as calcium chloride, brines, etc. A report on Ni-O-Nel was published in *CHEMICAL AGE*, last week, p. 1115.

New Recovery Plant

Sutcliffe, Speakman and Co. Ltd., Leigh, Lancs, exhibited a small static double adsorber recovery plant of new design on modern lines. It was arranged, complete with all ancillary equipment, as a 'packaged' unit. The unit can be fitted for either manual or automatic operation.

Radioactive Isotopes

Many of the latest techniques in the use of radioactive isotopes were demonstrated by the *UK Atomic Energy Authority*. Three working models showed the way in which radiations could be used to give an exact measurement of fluid levels for all types of vessels and liquids. Location of leaks

in underground pipelines, the use of light sources which need no fuel or maintenance, control of insect pests, elimination of static electricity, thickness measurements and industrial radiography were noted.

Some recent work on the uses of strong sources of radioactivity for such purposes as food preservation and sterilisation and one possible way in which industrial products could be irradiated after being packaged were shown.

Marchon Materials

A full list of agents and representatives throughout the world of *Marchon Products Ltd.*, Whitehaven, Cumberland, was prominently displayed. On their stand were also illustrated many of the manufacturing processes by which Marchon maintain strict control of quality.

New Centrifuges

Sharpley Centrifuges Ltd., Camberley, Surrey, exhibited machines in their complete range of Super-D-Canters. Increased coverage is now obtainable permitting handling up to 200 gall. per minute or more of slurries at pressures of up to 150 p.s.i.g.

The new P4000 and P7000 Super-D-Canters are stated to have not only the advantages of increased capacity and performance but, in addition, have introduced a completely new design concept into the construction of the scroll discharge type centrifuge. Super-D-Canter design differs fundamentally from all previous machines in being mounted vertically, and in having a self-centring bowl. This design allows the gearbox to be made integral with the bowl, and thus, the spline shaft used can be very short indeed.

Sulphuric Acid Absorber

Among the most interesting of exhibits by *QVF Ltd.*, Stoke-on-Trent, were a pure sulphuric acid absorber giving high yields from modest-sized equipment and a 100-litre steam-heated distillation unit.

The first was a form economically scaled down from the standard absorber. It is capable, however, of producing in 24 hours 1,250 lb. of 98 per cent sulphuric acid from a gas stream of 6 per cent SO_3 in air. The 100-litre distillation unit is intended primarily for operations in vacuum conditions with materials which decompose before boiling point is reached or which respond better when operating pressure is reduced.

The principal QVF exhibit consisted of a packed column made of glass, with a diameter of 450 mm. It is provided with a new kind of support for the packing and with distributors for the liquid. An electromagnetic reflux-distributor is built into the column, which can be remotely operated by means of an electronic device.

A still-head (ID 450 mm.) with 11.2 m² of cooling surface and a pipe bend was shown for the first time.

QVF Ltd. exhibited in conjunction with their German associate company, *QVF Gastechnik GmbH*, Wiesbaden-Biebrich.

New Research Exhibits at Frankfurt

A HIGH temperature furnace was displayed by the *Physical Institute of the Justus-Liebig University*, Gießen. The furnace has been used for the production of single crystals of zinc sulphate, cadmium sulphate, zinc selenate and cadmium selenate and cadmium phosphate. It was constructed in the workshop of the university. It can be heated to 3,000°C under 150 atm. pressure. A control cabinet checks purity of gases used, and controls water and power, and a transformer works at 40 kW. maximum. Crystal growth has been carried out in an inert atmosphere (argon), using graphite crucibles.

Attempts have been made to produce crystals of aluminium nitrate and lithium carbide, but both sublimed.

If enough commercial interest is aroused in the furnace, *Eruhrstrat Göttingen AG.*, of Germany, may produce the furnace. Other details of earlier work and development of the furnace are obtainable from *Zeitschrift für Naturforschung*, 1958, 13 No. 2, p. 105 (Albrecht Fischer).

Forschungsgesellschaft Verfahrenstechnik e.V. (GVT), Cologne, exhibited apparatus for measuring flow velocity of moving particle beds by using the heat transfer from the wall to the moving particles. This work is the subject of a thesis for a doctorate by Dip.Eng. R. Ernst. Possible applications to industry suggested are in drying and transport of sand, cement storage, high polymers, etc. For measuring flow velocity, the velocity must be compared using 'absolute' volumetric analysis.

Another exhibit demonstrated inter-mixing in a fluid flowing through a particle bed. Mixing has been studied in radial and axial directions. Mixing in axial directions is connected with a spectrum of resonance lines in the column filled with packing.

A newly developed calorimeter for the evaluation of brown coal having a relative error of approximately 0.8 per cent was featured by the *Institut für Chemische Technologie der Rhein-Westfälischen*, Aachen. This institute has also developed a process for the electrochemical synthesis of sebacic acid from the mono-methyl ester of adipic acid which is carried out by the intermediate production of the dimethyl ester of sebacic acid. The ester, which is sparingly soluble in water, is withdrawn continuously at a rate which depends on the pH of the mixture.

Other exhibits by this institute were as follows: An apparatus employing radioactive substances for rapid and precise evaluation of ion exchangers; an apparatus for estimating the heat of coking based on measurement of differences of temperature; an apparatus for radiological estimation of the hydrogen content of gas mixtures by measurement of β -absorption; and an apparatus for the study of organic vapour pressures.

A study of high-pressure process by the institute has led to the synthesis of benzonitrile to the production stage, and another process whereby azo-benzene is obtained from nitrobenzene by reduction with CO is being investigated.

NEW PRODUCTS, PROCESSES AND EQUIPMENT FEATURED ATACHEMA EXHIBITION

USING the well-known principle of the rotating cylinder, granulating machines by *Alexanderwek AG*, Remscheid, can be used for the continuous production of granules of a wide variety of organic and inorganic products. Granules from pasty or plastics materials as well as from products in the form of dust or powder can be formed. Particle sizes of from 1 to 8 mm. diameter can be produced by simply changing the working cylinder. The shape of the granules, as well as their degree of compression and resistance to abrasion, can be adjusted by selecting an appropriate cylinder. Capacity of the standard machine varies from 10 to 10,000 kg./hr. according to the product. In conjunction with a fine granulator very small granules down to 0.6 mm. diameter can be produced.

Amag-Hilpert-Pegnitzhütte AG, Nürnberg, displayed, in conjunction with *Klein Schanzlin and Becker AG*, Frankenthal/Pfalz, a schematic model of a process layout with transparent pipe lines and all necessary valves with the latest models of canned motor process pumps shown in operation.

CMY type for heating liquid circulation systems with temperatures up to 400°C; the CMG type for product circulation systems with temperatures up to 80°C and system pressures up to 16 atms. g.; CMD type for high pressure circulation systems with temperature up to 350°C and system pressures up to 400 atms. g. were shown.

New Freeze Drier

A new Secfroid freeze-drier, Lyovar, was demonstrated by *Appareils Secfroid Charles Pfister SA*, Lausanne. This can be used as a pilot plant in which small quantities of substances can be dehydrated under industrial working conditions.

Bauermeister Turbo Mills developed by *Hermann Bauermeister, Maschinenfabrik u. Mühlenbau GmbH.*, Hamburg-Altona, have new improved grinding elements. The effect of the air-vortices, which are produced in various interdependent layers, is increased by improved and specially shaped grinding elements. Excellent output rates are claimed.

This disintegrating mill, easily cleaned and maintained and needing minimum space, can be used for 'rather hard' products.

Farbenfabriken Bayer AG., Leverkusen, showed newly developed synthetic oils of the Polyran series. They contain ethers (-C-O-C- linkages), and lie chemically between the hydrocarbons and the esters. Noteworthy properties recorded are their low solidification point, excellent lubricating properties, and their resistance to temperatures up to 300°C.

Bayer's recently-introduced synthetic rubber based on polychloroprene, Per-

bunan C, was displayed. This rubber is characterised by good resistance to weathering, ozone, ageing and abrasion; it is also flame-resistant and resistant to a variety of chemicals.

Dehydag Deutsche Hydrierwerke GmbH, Düsseldorf, exhibited a large-sized scheme on modern production of fatty alcohols by means of the catalytic hydrogenation of fatty acids or their esters.

The new fatty acid alkylolamides were shown under the collective name Comperlan. These products have a range of applications in the cosmetic-pharmaceutical and chemico-technical field.

Dehydag exhibited two new plasticisers based on sebacic acid. Edenol 888, a dioctylsebacate having a water-clear colour, very low volatility and viscosity is used as a processing agent for p.v.c. or copolymers and for synthetic rubbers. Edenol 1800 is a polymeric sebacate with extremely low volatility. Plastics produced with it have a marked resistance to oils, fats, petrol, etc.

Sifting Machine

Of interest was the Vibro-rota high efficiency sifting machine produced by *J. Engelsmann AG*, Ludwigshafen. This has given good results in the sieving of plastics, using a combination of vibratory and rotary movement. The machine is manufactured in three different sizes and can achieve an output of 250-300 kg./hour with an effective sifting area of only 0.5 m². and mesh apertures of 100-150 microns when dealing with plastics raw materials which are difficult to sieve.

Parts which come into contact with the materials to be sieved are constructed of steel, aluminium, or rustless metals, according to requirements. The Vibro-rota can be supplied with a closed circuit air conveyor system.

Advantages of the automatic continuous operation, push-type centrifuge were stressed by the company responsible for their development, *Escher Wyss Ltd.*, Zurich, Switzerland. Uninterrupted flow of the mixture to be centrifuged and of the discharged material leads to particularly large outputs; as an example the EW Centrifuge Type C4 for centrifugation of sugar was exhibited. This is of sturdy design having a self-contained, totally enclosed unit with a built-in control system.

The capacity of this particular model is claimed to be at least 40,000 lb. raw sugar massecuite per hour with a maximum of 25 h.p.

Distillation columns with heating or cooling bottoms were featured by *Gewerkschaft Eisenhütte Westfalia*, Wethmar.

For fitting of bottom plates of cast iron distillation columns without the use of

bolts, a new method has been developed consisting of a rim cast in the column section which is chamfered towards the top. The bottom plates are made to fit the chamfered rim. Both the bottom plate and the rim have a groove, and by fitting a jointing in between an absolutely safe connection is obtained. This jointing prevents the machined surfaces, which are not corrosion-proof, from being subjected to corrosion by the distillation medium.

Steam Drum Drier

A drum drier of special design, with a steam heated jacket and also a steam heated cruciform internal fitting, was exhibited by *Friedrich Haas, GmbH*, Remscheid-Lennep. This design represents a combination of a steam tube drier and a drying drum with internal louvers. The cruciform fitting used to promote the trickling or tumbling is welded on to tubes passing through the drum, and results in the greatest possible transfer of heat from the heating steam to the material being dried.

Transfer of heat from the heating medium to the material being dried is effected only by conduction or radiation, no dust extracting plant being necessary: only the evaporated vapours have to be drawn off.

These special drum driers can be fed with cooling water and used as coolers.

Hagusta GmbH, Frankfurt, showed a model of an industrial water purification plant. Hagusta filter pipes coated with grit are used in this installation for the removal of mechanical impurities such as sand, fibrous material, fine metal particles, wood shavings and similar materials from the water supply. Plants with capacities of 30, 60, 150 and 350 m.³/hour are stated to have given excellent results in service.

New centrifuges noted on the stand of *Gebr. Heine, Viersen/Rhld.*, were continuous machines of the screw conveyor type and of the pushing type. They were of simple construction. The continuous centrifugation process has been modified so that besides good dehydration, the crystal structure is preserved as far as possible, the content of solids in the separated liquid is low, and the coherence of the cake of solids is loosened before discharge.

Novel Design French Sand Filter

A sand filter, which is manufactured in France by *Herfilco*, Paris, under a Dutch licence (IMACTI) is based on a novel principle. In contra-distinction to the normal filtration practice, the liquid to be filtered flows upwards through a bed of the filtering medium consisting of particles with a carefully selected grain size and passes through various layers of silica in which the grain size decreases from the base upwards. The liquid finally passes into an outlet channel which is embedded in the uppermost fine grained layer of silica.

Also on show were Poro-Klean filter candles, made of stainless 18-8 molybdenum steel with controlled porosities of 5, 10, 20 and 40 microns which provide a novel, simple and economic solution to the problems of liquid and gas filtration.

The field of application of these candles is claimed to be wide owing to their durability, resistance to shock, high temperatures (500°C), very high pressures (400 kg./cm.²) and considerable variations in loading due to the viscosity of the materials being filtered, as well as to their low initial cost and maintenance.

Cleaning is readily carried out by reverse flow, by dissolving the sediment in nitric acid, alkali or a suitable solution, or even by combustion.

Several new developments were featured by *Jenaer Glaswerk Schott and Gen.*, Mainz. There was a new type of heat exchanger compensated for thermal expansion which can be heated with steam at 13 atm. gauge pressure corresponding to a temperature of 191°C. These heat exchangers which may be used for heating or cooling, are cylindrical and made in nominal diameters of 80–500 mm. and with heat exchange surfaces of from 0.2–8 m.²

New Type of Distilling Vessel

A new type of distilling vessel has been developed with a capacity of up to 300 l. Heating is effected by means of steam-heated glass coils lying flat at the base of the vessel; these are compensated for thermal expansion and provide a heat exchange surface of up to 9 m.². Column sections are made in sizes up to a nominal diameter of 700 mm. and may be connected to columns of any length by new joint elements suited to the properties of the glass.

For rectification, columns with a diameter of 500 mm. are available and an efficiency of more than 30 theoretical plates may be attained. Attachments for distillation columns with magnetic operation and control enable a constant reflux ratio to be maintained in all sizes of column.

Also of interest was a distillation apparatus of *Jena glass Duran 50* which supplies pyrogen-free water by monodistillation. The apparatus is heated by electrodes. A special attachment on the distillation flask ensures that only the pure vapour phase may reach the condenser. Water droplets which still may pass a baffle plate system are separated by the condenser. Distillate is maintained sterile by a nitrogen cover. The optimal quantity of cooling water is regulated by a fixed nozzle and may be read off by an attached manometer.

Cracking Plant for Town Gas

Aug. Klonne, Dortmund, announced that the municipal works of Offenburg (Baden) had placed an order for a cracking plant for the continuous production of town gas from light mineral oil fractions. This plant is intended for the production of standard town gas from liquid gas, light benzene, or crude oil. It is now under construction and will operate according to a newly developed process. For the first time, this company states, it will be possible to produce gas of always uniform town gas quality by continuous operation in a small and moderately priced plant provided with indirectly heated cracking tubes with stationary catalyst. Activity of the catalyst can be maintained for long periods by regular reactivation, without having recourse to any interruption of the production process.

The plant will be put into operation in the summer of 1958. A model of the plant was exhibited.

New designs in the field of filtration were shown by *Krauss-Maffei-Imperial GmbH.*, München. These included a 'pressure plate filter' upon which the cake may be pressed up to 25 atm. This filter has the advantage that the duration of pressure lasts for some seconds during which time liquid extracted by pressure may be evacuated. Also shown was a dip filter which consists of filter plates that are removed at the end of filtration from the trough by lifting. A wash trough is then placed under the plate set and the cake is washed by complete submersion. After removal from this trough the cake is dried by suction and discharged by a so-called 'air knife'.

Constructors of plants for production of caustic soda, chlorine, hydrogen, etc., *Kriebs GmbH.*, Berlin, have developed an original method of drying wet chlorine gas. Sulphuric acid is atomised by rotating perforated cones and the wet chlorine gas passes the fine spray of sulphuric acid without pressure drop. (The spraying apparatus, fabricated completely in p.v.c., was shown.) The same principle is used for the absorption of chlorine-containing waste gases and allows the continuous production of sodium hypochlorite solution. Caustic soda solution inlet is automatically controlled by measuring the oxidation potential.

Chlorine Gas Drier has Low Power Consumption

Dried chlorine gas is compressed to 5 to 10 atm. in special two- or three-stage reciprocating compressors, having piston rods which are stated to require less attention than previously. A low power consumption in comparison with sulphuric acid rotary compressors is also claimed.

Plants for production of hydrochloric acid designed by this company are also of interest. Technical hydrochloric acid is produced but additional equipment is available by means of which, with appropriate change in the method of operation, pharmaceutically and chemically pure acid can be obtained.

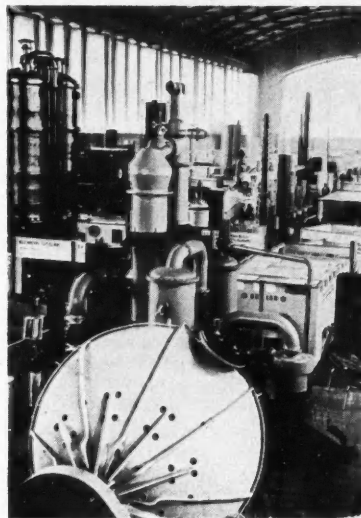
A mobile laboratory evaporating plant which is mounted on a trolley as a self-contained compact unit has been marketed by *Luwa AG.*, Zurich.

Vessels for delivery to the synthetics division of *Farbwerke Hoechst* were displayed on the stand of *Metallwerk Friedrichshafen GmbH.*

The first was a stirrer-kettle of 20 m.³ capacity made of chrome-nickel steel, material No. 4571, the bottom plated with foundation material MI and a covering of material 4571, a heating jacket of boiler-plate MI, in the form of a double jacket; a vessel diameter of 2,000 mm., and a length of 6,000 mm. across the bottom; total length 7,240 mm., made for the following operating conditions: inner vessel—vacuum; outer jacket—3.2 atm. working pressure, tested at 4.2 atm. pressure.

The second vessel exhibited was a pressure vessel of 20 m.³ capacity with a working pressure of 32 atm. in the vessel,

and 6 atm. in the half-shell heater. This vessel was also made of chrome-nickel steel. The half-shell tube heater was of steel 35.29, tubes of 83 mm. dia. and 6 mm. wall thickness. The diameter of the pressure vessel was 2,800 mm., cylinder height 2,950 mm., height measured from ground 4,150 mm.



Acrylonitrile drying plant on the stand of Hans J. Zimmer AG

Sole manufacturers on the Continent, of powder cellulose products are *Mikro-Technik GmbH.*, Miltenberg am Main. Characteristic of these products is the defined and reproducible particle size, ranging from the smallest grain structure to fibres of definitely limited length. The range of types is defined by their specific surface, which ranges from 4,500 cm.²/gr. for those with the longest fibres, to 19,000 cm.²/gr. for the finest types. All degrees of fineness between these limits can be supplied.

A new production process is stated to offer interesting possibility of coating fibres with a homogeneous and very thin, even monomolecular layer of active substances.

All types of tower packings were shown by *Dr. F. Raschig GmbH.*, Ludwigshafen. A new development was the so-called Perfo-ring which is claimed to have higher liquid and gas-rates and a lower pressure drop compared with the Raschig rings.

Special advantages of this Perfo-ring are its strong and mechanically resisting shape similar to the Raschig ring as well as the better height transfer unit values within the scope of higher vapour velocity. The price of this tower packing appears to be reasonable.

A new product featured by this company is the anti-ageing compound DTBP (2,6-ditertiary-butyl-p-cresol), which is used as an anti-oxidising agent in the rubber, plastics, mineral oil and foodstuff industries as well as with victuals. Also shown was the anti-skinning agent Raviol, a recently marketed product for use in the lacquer industry.

Further reports of new exhibits at Frankfurt, and a special article dealing with exhibits in polarography, will be featured in a future issue of *CHEMICAL AGE*.

Instrumentation Review

Continuous Photometry for Industrial Process Control

CONTROL of industrial processes by continuous photometry has been described with reference to the new industrial continuously recording photometer designed by Sigrist which incorporates automatic optical compensation, thereby eliminating frequent manual adjustments and permitting continuous nephelometric or turbidimetric measurements. Applications to the control of such processes as filtration, clarification, extraction, distillation and solution in the chemical industries are suggested, including examples in the pharmaceutical, fermentation, artificial fibres, petroleum and paper industries, and of course the sugar industry.

Thermogravimetry. For determining water content chemical and physical methods are described and the most useful instrument in drying operations is considered to be the thermobalance. An interesting recording balance for use in thermogravimetry has been demonstrated by the Chemical Inspectorate, Ministry of Supply, Kidbrooke, London SE3, in which an ordinary analytical balance has been adapted so as to record the change of weight of material heated in an electric furnace over suitable ranges of temperature. The off-balance of the beam is detected by a linear variable differential transformer and the balance is restored by means of the change in weight of the suspended electrode of a silver coulometer. The coulometer current, which is proportional to the rate of change of sample weight, is plotted on the recorder. The curve is thus a derivative of the normal thermogravimetric curve.

VPC Unit Developed

Vapour phase chromatography. A compact vapour phase chromatography unit has recently been developed by the Explosives Research and Development Establishment, Ministry of Supply, Waltham Abbey, Essex, employing a double U-tube column with ground glass joints, and having a 6-ft. path length. Adaptable for either hydrogen flame or catharometer detection a total load of 0.5 g. can be accommodated.

Ebulliometry. An improved ebulliometer, originally designed to follow rates of reaction, is now available in a smaller model more suitable for molecular weight determination. Developed by C. Heitler(1) in the Department of Applied Chemistry, Northampton College of Advanced Technology, London EC1, the unit embodies a modified Cottrell pump and boiling cavity to reduce superheating to a minimum. Temperature changes are measured by a suitably aged thermistor, Type Series F, produced by Standard Telephone and Cables Ltd. Temperature variations can be kept within $\pm 0.001^\circ\text{C}$, an error of ± 2.1 per cent been obtained with 50 mg. samples,

each determination taking three minutes. Manufacturer: A. Gallenkamp and Co. Ltd., 17/29 Sun Street, London EC1.

Spectrometry. A high-gain transistor amplifier for use with bolometer detectors has recently been developed. The unit incorporates a scale expansion system. Manufacturer: W. H. Sanders (Electronics) Ltd., Gunnels Wood Road, Stevenage, Herts.

Hydrogen cyanide in gases. A portable unit for the rapid determination of hydro-

by

W. J. Parker

This article describes recent instrumental developments in ebulliometry, photometry, spectrometry, thermogravimetry and vapour phase chromatography, and features special purpose instruments for determining:

- (1) In gases: hydrogen cyanide, radiation intensities.
- (2) In liquids: magnesium, sugar.
- (3) In solids: nickel on steel.

gen cyanide in air has been developed by B. E. Dixon, G. C. Hands and A. F. F. Bartlett(2) at the Department of the Government Chemist, Clement's Inn Passage, London WC2. Operating batchwise, a sensitivity of below 1 p.p.m. of hydrogen cyanide in air is reported with an accuracy of ± 10 per cent for concentrations above 10 p.p.m. and ± 20 per cent below 10 p.p.m. The operating range can be extended from 1 to 500 p.p.m. The method is specific for hydrogen cyanide and although the operating period is of the order of six minutes the unit appears to be eminently suitable for development as an indicating, recording or controlling instrument operating batchwise or continuously, for the determination of hydrogen cyanide in industrial atmospheres generally.

Magnesium in liquids. Magnesium contents of liquids may be readily determined with the EEL titrator, comprising a stabilised light source and photocell in a common housing. Magnetic stirring is provided for the batchwise determination, optical densities being indicated on an external galvanometer. Manufacturer: Evans Electro-selenium Ltd., Westminster Bank Chambers, Bishop's Stortford, Herts.

Nickel on steel. The thickness of electro-deposited and other metallic coatings, such as nickel on steel, may be determined non-destructively, irrespective of whether the coating and basis metal are magnetic or not, using the BNF plating thickness meter.

Based on the generation of thermo-electric potentials between probes at different temperatures, described by A. R. Heath(3), the instrument comprises in addition an amplifier, meter, controls and power supplies. Manufacturer: Nash and Thompson Ltd., Oakcroft Road, Chessington, Surrey.

Radiation in gases. A personal radiation monitor, with overall dimensions 7 in. by 2½ in. by 1 in., and weighing only 15 oz., measures the intensity of radiation and provides audible warnings if exceeding a pre-set level. Standard preset operational levels are 5.0 mr. and 25.0 mr., with a battery life of 45 hours. Designed to give instantaneous warning of radiation at a level which could be injurious to health, the acoustic output is interrupted for enhanced psychological effect. Manufacturer: Grove Electronics Ltd., Caxton Way, Stevenage, Herts, under UK Atomic Energy Authority licence.

Sugars in solution. A polarimeter has been developed from an original design produced by the National Physical Laboratory primarily for the continuous monitoring of the concentration of sugar solutions. The instrument, known as Type 143A, utilises the principle that the rotation of the plane of polarisation of light passing through a Faraday cell can be controlled by the current flowing in the cell. Operating on a null method, the polarimeter gives a direct indication of the rotation occurring in a sample and rotations up to 0.5° of arc can be measured directly, with an accuracy of $\pm 0.002^\circ$. Provision is made for the measurement of larger angles. Manufacturer: Ericsson Telephones Ltd., Instrument Division, High Church Street, New Basford, Nottingham.

REFERENCES

- (1) *Analyst*, 1958, April, 223-229.
- (2) *Analyst*, 1958, April, 199-202.
- (3) *Metal Finishing Journal*, 1955, April, 145.

Chemicals Exempted From Key Industry Duty

THE Treasury have exempted the following articles from Key Industry Duty until 18 August 1958:—

Synthetic organic chemicals, analytical reagents, other fine chemicals and chemicals manufactured by fermentation processes, the following:

Acrylic acid, beryllium sulphate, 2-chlorotoluene, ergosterol, glutamic acid, 1-phenylsemicarbazide, potassium xanthate, sorbic acid, trimethylene chlorobromide.

The Order, which came into operation on 19 June 1958, is entitled the Safeguarding of Industries (Exemption) (No. 4) Order, 1958, SI No. 975. Copies may be obtained (3d net, by post 5d) from HM Stationery Office, Kingsway, London WC2, and branches.

Places Available at Harwell School

The next standard course at the Harwell Reactor School on which places are available starts on 10 November 1958, and ends on 6 March 1959.

Fee for the course is £250 exclusive of accommodation. Applications will be considered from overseas as well as the UK and this will be the 17th standard course at the school.

Overseas News

WEST GERMAN CHEMICAL OUTPUT UP, BUT SALES DOWN

IN the first three months of 1958 chemical production in the German Federal Republic increased by 18 per cent but chemical sales by 5 per cent only to DM.4,340 million. Compared with 1957 when sales in the first three months were 16 per cent above the rate of the first quarter of 1956 the increase in sales this year has been rather small; so small that it forced German chemical manufacturers to add substantial quantities of various products to stocks.

German industrial production as a whole shows a 6 per cent rise for the first quarter of this year, and chemical sales at home were unfavourably affected by the slowing-down of the economic expansion and scaling-down of buying contracts by users anticipating a falling-off in employment. The building trades, suffering from bad building weather, and the textile industry reduced their purchases of paints, dyestuffs and other chemical products because of reduced consumption. Other users, however, seem to have postponed purchases as a precautionary measure, preferring to run down stocks pending a clarification of the economic situation.

Plastics output amounted to 155,000 tons in the first three months of 1958, a 16 per cent increase on the preceding year.

While export figures for the chemical industry as a whole are not yet available for the first quarter of this year, shipments abroad of pharmaceuticals rose by 23 per cent compared with the corresponding period of 1957 in spite of continued sharp competition. Unprocessed pharmaceuticals recorded larger export gains than branded articles. Pharmaceutical imports into the Federal Republic were 11.5 per cent above the previous year's level in the first three months of 1958.

New Cross-Linking Agent and Monomer

A new dithiol, glycol di-mercaptoacetate has been introduced by Evans Chemetics Inc., New York, US. The compound is stated to act as a cross-linking agent and monomer for special polymerisations by addition across ethylenic unsaturation and by reaction with active halogens.

Polish Sulphur Ore Plant Nears Completion

At Ogorzelec in Lower Silesia, Poland, work is nearing completion on a modern chemical combine for processing ore from the recently discovered Tarnobrzeg sulphur deposits (CHEMICAL AGE, 30 March 1957, p. 554). The capacity of the plant will be in the region of 180,000 tons of sulphur ore a year. The flotation concentrate contains 92 per cent pure sulphur, and the product from the refining plant which starts operation this month is to be 99.9 per cent pure sulphur.

Scientific advice in the building of the Ogorzelec plant has been given by the Institute for Sulphuric Acid and Phosphorus Fertilisers. By the end of June the sulphur from the plant should be available to Polish sulphuric acid factories.

Petrobás to Build Brazilian Synthetic Rubber Factory

The National Petroleum Council of Brazil has recommended the acceptance of plans by Petrobás for a synthetic rubber factory at Caxias on the outskirts of Rio de Janeiro, near a big new oil refinery which is being constructed by Petrobás.

It will be run by a mixed capital company, 51 per cent of the stock being retained by Petrobás and 49 per cent by private capital.

Installation of the new factory should be completed in two stages, production beginning in September 1959 with the use of imported butadiene and styrene. After December 1960 the raw materials will be produced by the oil refinery. The investment to be made is estimated at US\$49 million, of which 79 per cent will be in foreign currencies.

West German Potash Producers May Form Cartel

The West German potash industry has applied for registration as a 'rationalisation and export cartel' in accordance with Federal legislation. The need for basic research, increased efficiency and uniform domestic prices are given as reasons for the application. Joint action in export markets is deemed desirable because foreign competitors are also operating price agreements, some of them under state auspices.

Australian Carbon Disulphide Factory Starts Production

Production has begun at the Hunter River Chemical Co.'s factory at Tomago, NSW, Australia. It will produce carbon disulphide for making rayon fibre, sulphur chemicals, dry cleaning fluids and weed and insect killers.

Built at a cost of £A.500,000 the factory will be able to supply all Australia's present needs of carbon disulphide.

Europe's First Synthetic Glycerine Plant on Stream

The first plant for the manufacture of synthetic glycerine in Europe (the only one outside the US) has now come on stream at the Pernis (Rotterdam) refinery of the Royal Dutch/Shell group of companies.

This plant, operating on a continuous basis, is the final section of a complex installed for the manufacture of a range of related industrial chemicals, the first unit

of which was brought on stream in December 1956.

Glycerine is used in the manufacture of medical and pharmaceutical preparations, alkyd resins for the paint industry, cosmetics and cellulosic film. It was originally obtained exclusively as a by-product of the soap industry. The research work done by Shell Development Co. in California, however, led to the development of a method of manufacturing synthetic glycerine using as a starting material propylene which is produced in the processing of crude oil in a refinery.

The synthetic process, which yields glycerine of extremely high purity has been applied in the US on a large scale by Shell Chemical Corporation for some years now. The product fully meets the stringent requirements of the foodstuff and pharmaceutical industries.

Advantages of Isebacate Plasticisers

Ageing tests carried out in the US to determine colour stability and exudation rates in vinyl films containing various plasticisers have demonstrated that the dioctyl ester of isosebacic acid is comparable in performance to the same esters of sebacic and azelaic acids when used as vinyl plasticisers. The isosebacic acid also has the advantage of being lower in cost.

Dioctyl ester of isosebacic ester was developed in the research laboratories of US Industrial Chemicals Co., New York, US. A commercial plant for production of isosebacic acid is being started up at USI's, Tuscola, Illinois, chemical concern.

Urea Plant to be Built in Pakistan by Japan

Leading Japanese steel makers, Kobe Steel Works, have signed a formal contract in Karachi for the construction of a urea plant in Fenchugani, Sylhet, East Pakistan. The factory will be capable of producing 106,560 long tons of urea annually. Work is to be completed by the end of July 1961. After handing over the factory to Pakistan, Japan is to give technical assistance for two years, under a 'turn key' contract.

Goodrich-Gulf's Synthetic Rubber Plant Expansion

A \$1 million expansion has started for the Goodrich-Gulf Chemicals' Institute, West Virginia. The expansion is designed to increase the plant's production of crumb rubber. Installations will include an extruder drier for production of extrusion dried electrical grade rubbers and other special polymers.

Promotion of Fertilisers in Italy

ANIC and *Federconsorzi* have made an agreement concerning the distribution of nitrogen fertilisers produced at ANIC's Ravenna plant through *Consorzi Agrari*, which act as co-operative suppliers and marketing agents to Italian farmers. It is understood that fertilisers will be heavily promoted in an effort to induce Italian farmers (especially those in the southern half of the country) to use more and thus

improve the position of Italian agricultural products in the European Common Market. To help with this drive, some prices will probably be reduced.

Ionics to Install Water Desalting Plant

The first water desalting plant to serve a US city has been approved by Coalinga, California, an oil and farming centre of 6,000 people.

A 28,000 gallon-per-day electric membrane plant, built by Ionics Inc. Cambridge, Mass., will be installed late this year to furnish the city's drinking and cooking water.

Previously the city had to haul in fresh soft water 45 miles by rail since about 1900. Last year the water freight bill was over \$43,000 for a supply of about 17,000 gallons per day. The new plant is expected to save the city over \$400,000 in the next 10 years.

British Polystyrene Plant Equipment Ordered by Poland

At the plenary session of the International Labour Conference held in Geneva recently Mr. Jerzy Olszewski, Polish employer delegate, stated that the chemical works of Oswiecim, of which he is a director, were at present negotiating with Petrocarbon of London for a polystyrene plant.

Petrocarbon report that the Polish company placed an order for a large-scale polystyrene plant with them last year and the present negotiations are concerned with additional equipment for the plant. The value of the order is expected to amount to over £100,000.

US Project to Extract Alumina from Waste Coal

A project to extract metallurgical alumina from coal-mine wastes is jointly in hand by two US companies, Strategic Materials and North American Coal. The process of Strategic Materials consists of leaching mines wastes (15-25 per cent Al_2O_3) with high-strength sulphuric acid, followed by separation and decomposition of iron and aluminium sulphates to yield commercial alumina and iron oxide.

Three aspects of this work are the subject of patent applications. They are: a acid digestion which recovers more than 90 per cent of available alumina in one contact (temperature 400°F); separation of iron and aluminium at low cost to produce cell-grade alumina; and virtual 100 per cent recovery of acid values, after allowing for that consumed by alkaline materials in the coal waste, without resorting to either a sulphate electrolysis or a contact acid plant.

Third Formaldehyde Plant for Montecatini

Montecatini are to build a 55 million lb. per year formaldehyde plant at Castellanza, Italy. This will be the company's third unit and will employ the Montecatini process for manufacturing this product by air-oxidation of methanol. The first plant (25 million lb. a year) was built in 1955 after three years operation of a pilot plant. A second plant with a capacity of 55 million lb. a year was added in the following year.

In the Montecatini process, liquid methanol is injected into preheated air. The air-methanol mixture passes to a converter which uses mineral oil as a thermostatic fluid. The gases leaving the converter are cooled in a heat-exchanger and scrubbed counter-currently with water in a single, multi-stage absorption column in which the formaldehyde solution (37 per cent product) is recycled in the first two stages. The yield is generally over 90 per cent on a stoichiometric basis. Less than 1 per cent of formic acid (by weight) is contained in the product. Therefore equipment to remove formic acid is not required.

The catalyst used in the process is described by Montecatini as being formed by a mixture of metallic oxides. The catalyst is stated to have a life of more than a year. Capital cost of the plant is low, a 55 million lb. a year unit costing about £100,000 in Italy. In this cost is included control and measuring instruments, flameproof equipment, reserve compressors, pumps, but no storage tanks. The process is stated to operate automatically, with only one man per shift.

The catalyst used in the process is described by Montecatini as being formed by a mixture of metallic oxides. The catalyst is stated to have a life of more than a year.

Capital cost of the plant is low, a 55 million lb. a year unit costing about £100,000 in Italy. In this cost is included control and measuring instruments, flameproof equipment, reserve compressors, pumps, but no storage tanks. The process is stated to operate automatically, with only one man per shift.

Rheinpreussen Erecting Polycarbonic Acid Plant

A large polycarbonic acid plant is being erected by Rheinpreussen AG für Bergbau und Chemie at Homberg, Lower Rhine. Raw materials will be obtained from other plants of the company.

Bayer Factory Opened in Brazil

The first stage of the new Brazilian factory of Farbenfabriken Bayer AG was opened at Belford Roxo near Rio de

Janeiro, Brazil, recently, in the presence of the President of Brazil and the German Ambassador. Over DM40 million have been spent on the 90-acre site where dyestuffs, textile chemicals, dichromates, chromic acid, tanning substances, plant protection chemicals, insecticides, and sulphuric acid are to be produced. The dichromate plant was described as the first and only important unit of its kind in Central and South America; it will use minerals from the Brazilian State of Bahia.

BASF Expand Methanol Plant

A substantial extension of their methanol plant has been started by Badische Anilin- und Soda-Fabrik AG at Ludwigshafen, West Germany. The present output of more than 10,000 tons a month covers about half the production in the Federal Republic.

Pipeline Planned from Ruhr to Rotterdam

Three oil companies, Bataafsche Petroleum Maatschappij BPM (an operating company of the Royal Dutch/Shell group), the California Texas Corporation (Caltex) and the Mobil Oil Trading and Transport Co. of Gelsenberg, have established the Rotterdam-Rhine Pipeline Co. Ltd. to construct a pipeline between Rotterdam and the Ruhr with an initial capacity of 7½ million tons a year.

Preparations have already begun and the pipeline is expected to be complete in 1960. Initial capacity can be more than doubled by installing additional pumping stations. Length will be about 200 miles.

US Research Projects on High Temperature Elastomers

THREE projects in the US Air Force-sponsored search for improved high temperature elastomers and plastics for use in advanced aircraft and missiles are described in reports issued by the Office of Technical Services, US Department of Commerce, Washington 25, DC.

The first, 'The chemical reactions of silicon isocyanates' by J. F. O'Brien, Wright Air Development Centre (Order PB 131621, 50 cents), describes research aimed at determining whether silicon isocyanates can be used as monomers for the preparation of silicon-containing polyurethane resins. It was concluded that polymers can be formed from the reaction of silicon diisocyanates and glycols, or that low molecular weight polyesters could be further extended with these isocyanates.

The second paper, also by O'Brien, entitled 'Silicon-oxygen-tin polymers' (Order PB 131620, 75 cents), says that polymers were readily prepared by the reaction of dibutyltin acetate with a dialkyl or diaryldialkoxysilane, or dibutyltin dimethoxide with a dialkyl diacetoxysilane. Partially cross-linked polymers could be prepared by the addition of tetraethoxysilane or ethyltriethoxysilane to these reactions. Physical properties of the monomers varied

from waxy solids through viscous fluids to glassy solids. They were probably of low molecular weight. Liquid polymers could be prepared by the use of more of one monomer than the other.

In 'Polymerisation studies on monomers and evaluation of derivative polymers' by F. B. Jones, C. A. Lichtenwalter, P. B. Stickney and R. C. Heiligman, Battelle Memorial Institute (Order PB 131594, \$3), the polymerisation characteristics of a group of experimental fluorine-containing monomers were examined and preliminary evaluation was made of the potential of the resulting polymeric products as high temperature and solvent-resisting rubbers and plastics.

Homopolymerisation of six fluorinated olefin oxides in mass and solution using numerous polymerisation catalysts yielded only liquid polymeric products of low molecular weight. Some promising elastomers were yielded by copolymerisation of fluorine-containing propenyl ketones with dienes. Copolymerisation of fluorinated pentadienes, butenes, and pentenes was carried out to yield resinous solids, but homopolymerisation of these monomers was unsuccessful. Some fluorine-containing cyclic olefins were homopolymerised and copolymerised.

JOINT MEETING IN TURIN — 3

CA Summaries of Some Section Meeting Papers

SUMMARIES of some of the 150 section meeting papers presented at the eighth national congress of the Società Chimica Italiana held jointly with the Society of Chemical Industry in Turin recently are published below. In page 1155 is a report of the congress visit to the Settimo-Torinese factory of Farmitalia (SA Farmaceutici Italia Milano) where much new work was seen.

Other congress reports were published in *CHEMICAL AGE*, 7 June, p. 1019-1023 and 14 June, p. 1087-1091.

High Frequency Titration of Silver

'High frequency titration of silver in commercial alloys', G. Bionda, E. Bruno and A. Bellomo (Istituto di Merceologia dell'Università, Genova).

These workers described a simple and rapid method for the routine analysis of commercial alloys of low or high silver content using the Fisher high frequency titrimeter 9-316. From 1 to 10 ml. of a 1 per cent solution of the alloy in nitric acid is added to about 130 ml. of distilled water in the oscillometer cell. It is then titrated with 0.1 M. potassium chloride solution.

By plotting the titre against the change in capacity recorded by the oscillometer it is possible to construct a curve which shows with sufficient accuracy the quantity of silver present. Advantages of the method are that the presence of precipitates does not interfere with the titration and that either small or large amounts of silver can be titrated in the presence of a large excess of other ions with an accuracy equal to that obtained by other more laborious methods.

Identifying Sugars with Indole Derivatives

'Identification of sugars in paper chromatography with indole derivatives', E. Ragazzi (Istituto di Chimica Farmaceutica dell'Università, Padova).

Indole and its derivatives have been suggested for identification and determination of sugars and as specific reagents for certain classes of these. Development of chromatograms with β -indolylacetic acid was known. In the present work indole itself, skatole, tryptophan and β -indolylbutyric acid were all used. Carbazole has also been considered.

Indole and skatole revealed all the sugars, both aldoses and ketoses. β -Indolylacetic acid, tryptophan and carbazole are specific for ketoses. At a similar concentration to that of the sugar, β -indolylbutyric acid was found to exhibit a much greater sensitivity with ketoses. Best results were obtained in association with trichloroacetic acid or oxalic acid at temperatures

between 90° and 120°C. The possibility of extending the technique to quantitative measurements, particularly of products of biological origin, is being studied.

Micro-estimation of Boron

'Micro-estimation of boron', E. Bovalini, L. Pucini and A. Lo Moro (CAMEN, Chemical Laboratory, Livorno).

Micro quantities of boron are precipitated as a barium-borotartarate complex (J. A. Gautier and P. Piquard, *Mikrochem. und Mikrochimica Acta*, 1951, xxxvi/xxxvii, 793). The precipitate is collected by centrifugation and washed. It is examined by determining the barium by flame photometry at a wavelength of 873 millimicrons. This method is stated to have led also to an indirect method for the determination of boron.

Amino Acids Determined by VPC

'Vapour-phase chromatography for determination of amino acids', A. Liberti and G. P. Cartoni (Istituto di Chimica Analitica dell'Università, Messina).

Amino acids may be successfully separated and determined by vapour-phase chromatography after their conversion to the oxyacid and successive methylation with diazomethane. The methyl esters obtained are separated on a column of celite-silicone at 20 per cent and are determined coulombometrically after combustion.

New Pyrazinamide Derivative with Tuberculostatic Activity

'New pyrazinamide derivative with tuberculostatic activity', A. Calo and V. Evdokimoff (Istituto Superiore di Sanità, Rome, chemical laboratory).

A series of pyrimidine derivatives, analogous to the well-known sulphonamide derivatives, were prepared. It was expected that these derivatives would have increased activity and that unwanted side-effects would be diminished.

Three derivatives were described, pyrazinamide-pyrimidine, methyl pyrimidine and dimethyl pyrimidine. It was found that their activity was equal to or greater

than that reported in the literature for pyrazinamide. The toxicity, as predicted, was not greater than that of pyrazinamide and investigations in progress indicate that these derivatives may be significantly less toxic than pyrazinamide. It is believed that further pharmacological study of the products may eventually establish pharmacodynamically useful properties for these compounds which are independent of their bacteriostatic activity.

Synthesis of Indol-2-Acetic Acid

'Synthesis of indol-2-acetic acid', R. Guiliano and M. L. Stein (Istituto di Chimica Farmaceutica dell'Università, Rome).

By following a different reaction scheme, the difficulties encountered by M. Matell are stated to be overcome. Matell reacted the chloride of o-nitrophenyl acetic acid with sodium salt of ethyl acetoacetate. Reduction of the compound formed (ethyl γ -(orthonitrophenyl)- α -acetyl acetoacetate) by zinc and acetic acid gave the unstable ethyl ester of indol-2-acetic acid. The free acid proved to be even more unstable and rapidly changed into coloured oxidation products. Similar results were obtained with the benzyl ester.

It was found that when γ -(o-nitrophenyl)-acetoacetic acid is directly reduced by sodium hydrosulphite, 2-indolacetic acid may be isolated. The acid, however, rapidly undergoes changes, especially in solution, and it has not been possible to test it for auxin activity.

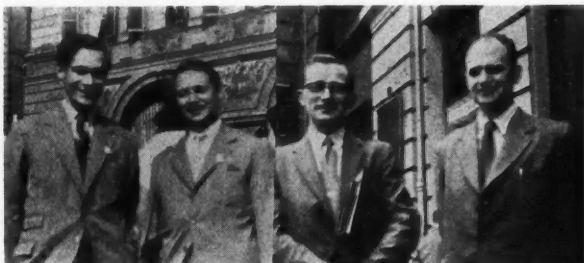
X-Ray Characterisation of New Isotactic Polymers

'X-ray characterisation of some new isotactic polymers', I. W. Bassi, G. Natta and P. Corradini (Istituto di Chimica Industriale del Politecnico).

In a short note the authors reported the results of the X-ray characterisation of some new isotactic polymers, synthesised for the first time at the Polytechnic Laboratory, Milan. The polymers are some new fluorinated polymers capable of giving fibres. The polymers are parafluorostyrene, orthofluorostyrene, orthomethyl parafluorostyrene, the polymer of alpha-vinyl naphthalene and the polymer of alkyl-trimethyl-silicone.

It is stated that the form of the chains of these polymers, helical with tertiary or quaternary symmetry, according to the

In Turin for the joint congress, 1. to r. Dr. R. J. Boscott, Pfizer Ltd., Dr. Kupfz, Hoffmann-La Roche, Basle, H. Hodge, Esso Petroleum Ltd., and Dr. F. C. Copp, Wellcome Research Laboratories



spacing and the manner in which the substituents of the crystalline reticulum are arranged, confirm their isotacticity and the stereoselectivity of the process of their synthesis.

Crystalline Structure of Polyorthofluoro-styrene

'Crystalline structures of isotactic polyorthofluoro-styrene', P. Corradini, G. Natta and I. W. Bassi (Istituto di Chimica Industriale del Politecnico, Milan).

The crystalline structure of polyorthofluoro-styrene has been determined by means of x-ray spectra of the polymer fibres. The special grouping is reported as being R3c with $a=b=22.1$ Å $c=6.65$ Å.

A Fourier projection on plane ab of the content of an elementary cell was performed. The chain was found to have the symmetry of a ternary helix; in the reticulum at each right-handed chain, three left-handed chains appear and vice versa.

Infra-Red Spectrum of Isotactic Polypropylene

'Infra-red spectrum of isotactic polypropylene interpreted', M. Peraldo (Istituto di Chimica Industriale del Politecnico, Milan).

This author studied the infra-red spectrum of crystalline isotactic polypropylene, examining aggregates of both disorganised and monodimensionally organised crystals.

In view of the monoclinic crystalline structure of polypropylene, and the fact that the chain is bound in the form of a 3-turned helix, it was found possible to analyse the normal modes of vibration. The number of bands observed and their infra-red dichroism are stated to be in agreement with what would be expected if the ternary symmetry of the supposedly isolated isotactic chain is considered.

Reducing Ethinyl Carbinol Steroids

'Reduction of ethinyl carbinol steroids with lithium and alcohol', P. de Ruggeri and C. Ferrari (Laboratori Ricerche Ormonoterapia Richter S.p.A.).

Reduction of ethinyl carbinols with alkaline earth metals and alcohol in liquid ammonia leads to vinyl carbinols which, by hydrogenolysis give ethylidene derivatives. Preliminary treatment with lithamide, followed by normal reduction, produces vinyl carbinols and hinders subsequent hydrogenolysis.

These results are stated to provide a new and simplified synthesis of 17 α -vinyl-19-nor-testosterone, a compound of interest for its own sake and as a precursor for the preparation of 19-nor-deoxycorticosterone.



Dr. C. I. Broderick, Boots Pure Drug Co. Ltd., Dr. F. P. Doyle, Beecham Research Laboratories, Dr. H. W. Wood, Ilford Ltd., Dr. D. S. Morris, Parke, Davis and Co. Ltd., and Dr. D. O. Holland, Beecham Research Laboratories

Stereospecific Polymerisation of Diolefins With $TiCl_3$

'Stereospecific polymerisation of diolefins with $TiCl_3$ ', L. Porri, G. Natta and L. Fiore (Istituto di Chimica Industriale del Politecnico, Milan).

$TiCl_3$ can exist in three crystalline forms, α -, β - and γ - forms respectively. The α form, violet, is obtained by reduction of $TiCl_4$ with H_2 at 700°-800°C. The brown β form is obtained in hydrocarbon solution by the decomposition of titanium trichloro-monoalkyls, or by the action of electrical discharges on a gaseous mixture of H_2 and $TiCl_4$. The γ form, violet as is the α form, has not previously been known; it is obtained by heating the β form to approximately 300°C. The β form presents a structural stratification, Porri *et al.* report, and can be considered a bidimensional polymer of $TiCl_3$. The γ form has a fibrous structure and can be considered a linear polymer of $TiCl_3$.

Stereospecificity of the aluminium-alkyl- $TiCl_3$ (α β , γ) catalytic systems in

the polymerisation of butadiene and isoprene has been studied and it was found that the stereospecificity depended on the type of reticular structure of $TiCl_3$, which constitutes the heterogenous part of the catalyst.

Diverse stereospecificity is particularly evident, it is reported, in the polymerisation of isoprene: Catalysts prepared from $TiCl_3$ (α , β , γ) give polymers made up primarily of 1,4 trans isomers with structure equivalent to that of natural guttapercha, while those prepared from $TiCl_3$ (α) give polymers consisting of 1,4 cis isomers with structure analogous to that of natural rubber. In the polymerisation of butadiene, the catalysts obtained from $TiCl_3$ (α) give, as in the case of isoprene, 1,4 trans and 1,4 cis units with a prevalence of the latter.

The catalysts obtained from $TiCl_3$ (γ) give polymers comparable to those obtained with α form.

Producing Sebacic Acid from Butadiene

'Sebacic acid, decamethylene-diamine and amino-decanoic acid from butadiene', G. Boffa, D. Costabello, F. Minisci and A. Quilico (Istituto di Ricerche 'G. Donegani' Montecatini, Novara).

Production of sebacic acid, decamethylene-diamine and amino-decanoic acid from butadiene via 1-chloro-4-cyano-2-butene and 1,8-dicyano-2,6-octadiene was described. The 1-chloro-4-cyano-2-butene is obtained by partial cyanisation of 1,4-dichlorobutene. With reduced iron in the presence of a nickel-based catalyst, 1-chloro-4-cyano-2-butene can be condensed to 1,8-dicyano-2,6-octadiene, to give a linear chain of ten carbon atoms.

Dicyano-octadiene may be converted in high yields into:

1. Sebacic acid, by selective reduction of the double bonds using a palladium catalyst, followed by saponification of the sebacic nitrile with hydrochloric acid.
2. Decamethylene-diamine, by a two-step reduction—the first of the double bonds as before, the second of the CN groups using a Raney nickel-type catalyst.
3. Amino-decanoic acid, by a semi-saponification followed by hydrogenation, using Raney nickel, of the remaining CN group.

These three products are of considerable interest in the field of synthetic fibres.

Isotactic Polymers of Methyl Substituted Styrenes

'Isotactic polymers of methyl substituted styrenes', D. Siamesi, G. Natta and F. Danusso (Istituto di Chimica Industriale del Politecnico, Milan).

Stereospecific polymerisation of some methyl derivatives of styrene has been examined by the above-named workers, with particular attention being paid to the nature of the products obtained. According to their structure, it proved possible to obtain from these monomers structurally organised linear polymers, some of which were crystallisable isotactically to high or medium degrees of crystallinity while others were non-crystallisable.

The influence which the substitution position exercises on the speed of polymerisation and on the structure of the polymer has been found to be in relation with the effect of the substituent itself on the electronic configuration of the monomer and the effects of a steric nature on the possible arrangements of the macromolecules in the solid state.

Siamesi *et al.* suggest that the exceptionally high crystal fusion points and in some cases, the ease with which the crystals orientate themselves, indicate interesting possibilities for the use of the crystallisable products.

Viscosity Measurements and Isotactic Polystyrene

'Light scattering and viscosity of a solution of isotactic polystyrene', L. Trossarelli, E. Campi and G. Saini (Istituto di Chimica dell'Università, Turin).

Light scattering and viscosity measurements have been made at 30°C of a toluene solution of an isotactic polystyrene fraction of a molecular weight between the limits 155,000 and 707,000.

(continued on page 1166)

CONGRESS MEMBERS VISIT FARMITALIA

New Research and Process Work Inspected

WELCOMING British and Italian chemists at a works visit to the Settimo-Torinese factory of Farmitalia (S.A. Farmaceutici Italia Milano) the pharmaceutical section of the Montecatini group, the president of the company, Dr. B. Lamberti-Zanardi, said that when the factory was started at Settimo-Torinese in 1907 it extended over some 150 acres—to-day the plant takes up 370 acres.

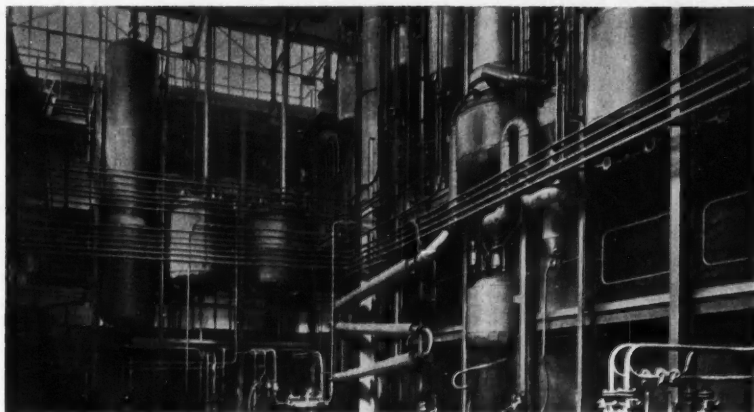
Research into new drugs is carried out at the company's headquarters in Milan and pharmaceutical specialties are prepared and packed at another plant, also in Milan.

Farmitalia have laid down a development and research programme extending over the next few years and radical practical modernisation of the factory at Settimo has been implemented. The company have their own social welfare scheme and two new villages are under construction for the workers. At the Settimo plant, 1,200 persons are employed, 1,000 of whom are operatives.

Taken over in 1935

When the factory was set up in 1907 it was equipped for the industrial production of ethyl alcohol, magnesia, bismuth salts and salicylic acid and its derivatives. In 1935 it was taken over by Farmitalia and existing plant was progressively renewed and improved in line with production demands.

Farmitalia, in alliance with Montecatini and in collaboration with their French associates Rhône-Poulenc, planned and built new plants for the synthesis of pyrazolone and guaiacol derivatives and on an industrial scale for ethylene derivatives such as glycol and ethanolamine. This was followed by the production of permanganate, hydroquinone, phenolphthalein, glycerophosphate and a wide range of other pharmaceutical substances. Later, after studies on synthetic antimalarials, plant was installed for the manufacture of the acridine antimalarial, Italcina, and of several barbiturates. At the same time manufacturing facilities for salicylate and its derivatives was increased in size. Research work on livers of various fish, led to the production from tunny-fish liver of an anti-anaemic principle of high haemopoietic potency and of a liver protective factor. Certain sulphonamides were also developed. During the post-war years, production was begun of the antibiotics penicillin, streptomycin, chloramphenicol and of the



p-Aminosalicylic acid plant, said to be world's largest

antitubercular agent, isonicotinyl hydrazide.

Today, production of the fermentation antibiotics penicillin, streptomycin, chlorotetracycline and recently of the newest antibiotic cycloserine, in the new modern plant at the Settimo-Torinese factory ranks with the most comprehensive production units in the antibiotic field and for other pharmaceuticals and their intermediates.

In the field of biosynthesis must be mentioned not only cycloserine (the newest antibiotic and antitubercular agent) but vitamin B₁₂ which is made as a direct product and not, as in this country, as a by-product of streptomycin. The large capacity plant in production operation allows considerable quantities of vitamin B₁₂ to be exported.

The visit to the Settimo-Torinese factory with Dr. S. Vietti, assistant manager of Farmitalia, as guide, allowed visitors to see the new installations for antibiotic production. A pilot plant of 250 gallons capacity was in operation for production of cycloserine. Alongside this was the

large (20,000 gallons) fermentation pot used for penicillin, tetracycline, etc. The vessels used in this section were of silicon-iron lined with ebonite or with lead or mild steel, it was learned. Broths for antibiotic production were transported through pipes carried overhead to the fermentation department.

In penicillin production at Settimo, use is made of cationic amberlite resin in the first stages of production and in the second, of anion amberlite resin. Streptomycin is obtained as a calcium chloride complex.

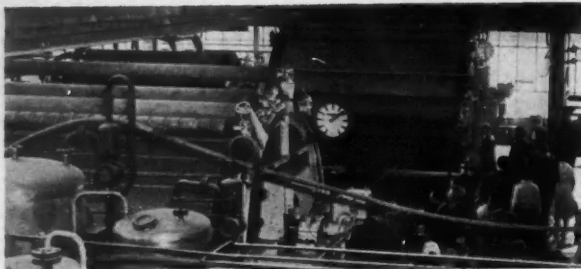
Operation of this new antibiotics plant has necessitated reorganisation of all the technical services (steam, power, water, refrigeration and workshops). Indeed, because of the factory demand for electricity a power house has been set up having power installations of 3,000 H.P. Fuel used for the power plant is methane piped from the Po valley. Steam boilers work at 750 lb. p.s.i. and the steam is reduced to 90 lb. p.s.i. Of the electricity used at the plant, one-third only comes from Italian power stations, the remaining two-thirds being provided by the factory's own power plants.

The factory consumes 330,000 to 440,000 gallons of water an hour, and 30 to 40 tons an hour of steam under pressure. Workshops in the factory have been equipped throughout with a comprehensive range of efficient machinery.

Antibiotic production requires large quantities of solvents. Farmitalia have a fine modern solvents recovery plant where such solvents as amyl alcohol, ethyl alcohol, chloroform, pyridine, etc., are recovered. (No figures regarding quantities of solvents recovered available.) Because of the factory's heavy requirements for ice, a plant has been set up for the production of ice. Phosgene, chlorine, nitrous oxide and other poisonous substances are all produced in an open air plant. From iodine produced in Italy, Farmitalia makes bisublimite iodine, iodides and organic iodine derivatives such as diiodohydrine and diiodohexamethyl-diamino-isopropanol.



A group of visitors headed by Dr. S. Vietti of Farmitalia (right) and Dr. C. I. Broderick of Boots (left) in the antibiotic concentration laboratory of Farmitalia



Penicillin filter presses at Farmitalia

Large capacity plant produces all the more important inorganic mercury compounds such as the chloride, chloramide, yellow and red oxides, for pharmaceutical and industrial use. All the common salts of bismuth (subnitrate, basic carbonate, subgallate and tribromophenate, as well as certain main organic derivatives are produced.

From phenol provided by Montecatini chemical works, Farmitalia produced one ton daily of salicylic acid. The salicylic acid plant was notable for its layout and the use of aluminium for vessels, hoppers and collecting bins. Other salicylate derivatives such as acetylsalicylic acid, sodium salicylate and methyl salicylate are produced both for internal use in the factory and for other principal pharmaceutical works in Italy. In this group of products is included p-aminosalicylic acid (PAS) and its calcium and sodium salts. Farmitalia claim that they have the largest plant in the world for the production of PAS. Starting from Montecatini's aminophenol, PAS is synthesised completely. About 100 tons are produced monthly.

Sulphonamides

Of the sulphonamides, all the more important derivatives of p-amino benzene-sulphonamide—pyridine, thiazoles, guanidines and pyrimidines—are produced. Included in this group of products is Farmitalia's recently produced tolbutamide for hyperglycaemia and carbutamide.

The sulphonamide plant is a large one and production is of the order of $\frac{1}{2}$ ton of sulphaguanidine and 2 tons of other sulphonamides daily.

Guaiacol and its derivatives are synthesised at Settimo-Torinese. The guaiacol is mainly used for the production of vanillin and potassium guaiacol sulphonate.

Other synthesis carried out at this factory include those of dimethylamino-phenyl-dimethyl-isopyrazolone (Itamdone) and its meta-sulphonic derivative, Dipyrone. Barbiturates derived from malonylurea (diethyl barbituric acid, phenylethyl barbituric acid, Gardenal or phenobarbitone, the thiobarbituric acid Farmotal and others) are produced in large quantities. Almost all salts of glycerophosphates for pharmaceutical use are manufactured on a large scale.

Associated with antibiotic and vitamin B12 manufacture is a recently installed production unit for additives to animal feeding stuffs.

Piperazine has been manufactured by Farmitalia on a large scale for the last two years, a high tonnage for this type

of product being produced each month. The company is probably the most significant exporter of this product in Europe.

Therapeutic compounds discovered during the last few years which are now assuming increasing importance in

therapy are the tranquilliser drugs. One such tranquilliser, chlorpromazine, is synthesised in the Settimo-Torinese factory.

Recent additions to Farmitalia's range are Cinearine and Steranbol. The former is based on an extract obtained from artichokes and has been found to be of value in the treatment of hepatic disorders. Steranbol is a derivative of 4-chlorotestosterone acetate and is an anabolic-type steroid preparation.

The whole factory of Farmitalia at Settimo-Torinese impresses by its careful layout of plant, the attractive appearance of equipment and the unusually high degree of tidiness in all sections of the plant. Large, efficiently equipped workshops undertake design of new plant and its manufacture or alteration.

TURIN SECTION PAPERS

(continued from page 1164)

An unfractionated sample of a polymer with a very high molecular weight ($M_w = 4,360,000$) has also been investigated.

The figures obtained were in agreement with those obtained by Natta, Danusso and Moraglio using osmotic measurements. The results confirm Natta *et al.*'s conclusions that no appreciable difference exists between the behaviour in solution of isotactic and non-isotactic polystyrene, and also their conclusions on molecular dimensions.

The figures relating to the non-fractionated isotactic polystyrene are explained by assuming an exceptionally high M_w/M_n ratio, although the possibility of an especial rigidity of the isotactic polystyrene molecule is not excluded.

This work is to be published in the *Journal of Polymer Science*.

New Series of Ganglionic Blocking Agents

'A new series of ganglionic blocking agents,' F. P. Doyle (Beecham Research Laboratories Ltd., Bletchworth).

A new series of analogues of the quaternary ammonium ganglionic blocking agents has been prepared by this worker, in which one quaternary ammonium grouping has been replaced by a sulphonium grouping. The optimum chain length and size of terminal alkyl grouping for maximum hypertensive activity has been determined. Several compounds of a high order of activity have been prepared. Some 75 members of this new series have been tested pharmacologically.

Sintered Boron Carbide

'Research on sintered boron carbide,' D. Lenzi and P. L. Pellegrini (Larderello S.p.A., Larderello).

Boron carbide has been studied in both its initial state and after subjecting it to a sintering process. The probable formula for boron carbide is suggested as being B_4C by Lenzi and his co-worker. Commercial boron, in addition to B_4C , was also found to contain small amounts of other substances originating either from the

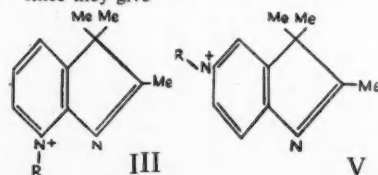
starting materials or acquired during the various stages of preparation and processing. The slight differences in composition after sintering have been observed by chemical methods and confirmed by x-ray crystallography. Ultrasonic measurements have been used by these workers and are reported as giving precise and reproducible information on the nature of the sintered material.

Diazaindenes and their Quaternary Salts

'Diazaindenes and their quaternary salts,' G. E. Ficken and J. D. Kendall (Reawick Laboratory, Ilford Ltd.).

Methyl isopropyl ketone 2-pyridylhydrazine and the corresponding α -methyl- α -2-pyridylhydrazine can be cyclised under conditions of the Fischer indole synthesis to 1:1:2-trimethyl-3:4-diazaindene (I) and 2:3-dihydro-1:1:3-trimethyl-(2-methyl)-2-methylene-3:4-diazaindene (II) respectively. Compound I readily forms a methiodide and ethiodide from which cyanine dyes can be prepared; II also gives cyanine dyes which are isomeric but different from those obtained from the methiodide of I. This suggests that quaternary salts of I have the structure (III).

Methyl isopropyl ketone 4-pyridylhydrazine cyclises to 1:1:2-trimethyl-3:6-diazaindene (IV) which forms quaternary salts believed to have the structure (V) since they give



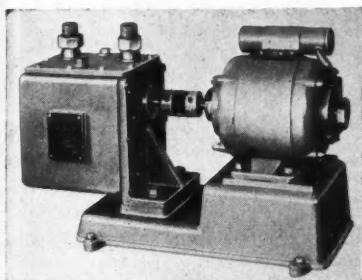
cyanine dyes with similar characteristics to those obtained from III. Compound 1:1:2-trimethyl-3:5 (VI) or 3:7-diazaindene (VII) (from the 3-pyridylhydrazine) gives a methiodide which is unreactive, suggesting that salt formation must also have taken place in the pyridine ring.

E-MIL PLASTICS STOPCOCK

The E-mil plastics stopcock, constructed of clear p.v.c. tubing, is mounted in a high density polythene housing. The stopcock is free from glass particle contamination and is claimed not to require any lubricant, thus ensuring freedom from grease contamination and blocked jets. It is particularly suitable for caustic solutions owing to its non-freeze properties. The 50-ml. burette is now available supplied with this stopcock, and other types will be ready shortly from the makers, H. J. Elliott Ltd., Treforest Industrial Estate, Nr. Pontypridd, Glam.

ROTARY VACUUM PUMP

LATEST addition to the Metrovac range of rotary vacuum pumps is type DR210, comprising two single-stage, vane-type pumps mounted in a single oil tank and driven by a common shaft. The equipment, therefore, has the pumping characteristics of two single-stage pumps. Since the centre lines of the sliding vanes in the two rotors are arranged mutually at right angles, vibration is reduced. Operational noise has been



Metrovac rotary vacuum pump

kept down by using a quiet type of exhaust valve assembly and helical reduction gears.

The DR210 is fitted with oil baffle, sight glass, gravity drain plug and pressure drain connection on the top cover. For use where gravity draining of the pump case is impracticable, a pressure drain attachment can be supplied. For each section displacement is 1 litre per sec. at 370 r.p.m. rotor speed, ultimate pressure at 10 microns Hg by McLeod gauge. The pump is approximately 21 in. long, 10 in. wide. Manufacturers are Metropolitan Vickers Electrical Co. Ltd., of Trafford Park, Manchester 17.

AUTOMATIC DISTILLATION APPARATUS

THE Widnes firm, J. W. Towers and Co. Ltd., have produced an instrument which they state is the only one of its kind manufactured outside the US. Their automatic standard distillation apparatus, developed by Shell, is designed to obtain results comparable, without correlation, with those obtained manually in accordance with the various standard methods. It is intended for carrying out the following tests: IP.123/55 for petroleum products boiling below 370°C (methods 'A', 'B' and 'C');

The E-mil plastics stopcock, constructed of clear p.v.c. tubing, is mounted in a high density polythene housing. The stopcock is free from glass particle contamination and is claimed not to require any lubricant, thus ensuring freedom from grease contamination and blocked jets. It is particularly suitable for caustic solutions owing to its non-freeze properties. The 50-ml. burette is now available supplied with this stopcock, and other types will be ready shortly from the makers, H. J. Elliott Ltd., Treforest Industrial Estate, Nr. Pontypridd, Glam.

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EQUIPMENT REVIEW

Chemical Plant: Laboratory Apparatus Safety and Anti-Corrosion Products

A.S.T.M. methods (D.86-54, D.158-54 and D.216-54).

Information obtainable from tests is: correction temperature; initial boiling point; final boiling point; total recovery; continuous 'vapour temperature against recovery' curve. In addition, indicators on the front panel show: time to i.b.p.; time from i.b.p. to f.h.a.; time from f.h.a. to f.b.p.; time from f.b.p. to end of test.

Many units are interchangeable between apparatus. The draught screen is of stainless steel, the condenser bath tinned copper. The silver grey finish of the apparatus' aluminium casing is unaffected by hydrocarbon fumes and spillage. All controls are on the front of the instrument, which requires 3 ft. by 2 ft. of bench space, single-phase a.c. supply and cooling water.

One tester can operate four instruments.

ANTI-WHITE RUST PROCESS

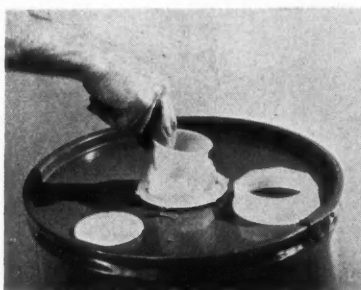
A PROCESS to reduce the formation of white rust on galvanised steel sheets has been developed by John Summers and Sons Ltd., Shotton, Chester.

The new process which is already being included as part of their manufacturing technique of Galvatite, a galvanised steel sheet product, has been developed by Summers' own research team and does not diminish the brilliance of the sheet surface nor reduce the spangle.

10 - GALL LINED DRUM

THE Armadillo, a new 10-gall. container, can be obtained from Reads Ltd., Orrell Lane, Walton, Liverpool 9, or from Cascelloid, Abbey Lane, Leicester. Both companies joined in its development. Composed of an outer steel drum and an inner semi-rigid polyethylene liner, the container is designed for the transport and storing of acids, chemicals and other corrosive liquids. It can be used many times.

The pourer spout supplied with each drum is reversible so that after use it can be

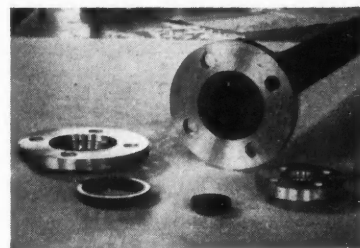


New Armadillo lined drum with reversible pourer spout

packed away, and the bottom of the drum is recessed for easy stacking. The Armadillo needs no outer packing and conforms to the relevant GPO and transport regulations governing liquids. Contents are safeguarded by an anti-pilfer seal and, being a full-aperture drum with a hoop closure, the polyethylene liner can be completely removed. All parts are replaceable.

STUBFLANGE PIPE COUPLINGS

A RANGE of stubflange couplings, in sizes from $\frac{1}{2}$ in. to 6 in., is now available from M. P. Components Ltd., a subsidiary of Cawley Plastics Ltd., Wey Lock Works, Byfleet Road, New Haw, Weybridge. Each assembly consists of a stubflange machined from either high density polyethylene or unplasticised p.v.c. and an aluminium backing flange machined to mate with the stubflange and drilled to BS Table 'D'. The stubflange is welded to the tube after first sliding the backing flange on the length of the pipe. After facing the end of the pipe and stub, the backing flange is brought up for bolting. A gasket of neoprene rubber, or flexible p.v.c., is



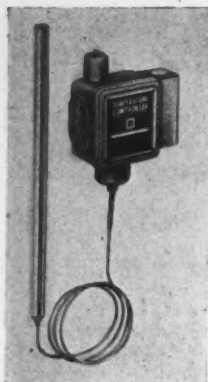
Stubflange assembly for plastics pipe by M.P. Components

advised and the machining allows for a slight protrusion of the plastics on to the gasket so that when two flanges are tightened a good seal is made.

M. P. Components Ltd. state that the advantages of this type of coupling are that: pressure is applied to the stubflange close to the tube minimising the torque applied to the p.v.c. flanges; the backing flanges can be rotated to avoid any difficulty in the alignment of bolt holes; its light weight renders special support for the joint unnecessary; it mates with existing lines using BS Table 'C' or 'D' flanges.

HONEYWELL CONTROL INSTRUMENTS

PRESSURES between 0 and 300 p.s.i. and temperatures between 0° and 700°F can be controlled by the instruments now manufactured by Honeywell Controls Ltd., Ruislip Road East, Greenford, Middx.



**On-off
modulating
controller
now made
by Honeywell
Controls**

Remote bulb temperature controllers are for adjusting temperatures in vats, pipes, etc. Temperature changes at the bulb are transmitted by capillary tubing to a bellows, movements of which operate a switch or, for modulating control, a potentiometer slider. The pressure controllers can be used for direct control of, or to actuate alarm devices on, boilers, retorts, etc. They can also be used for liquid level control. Two-position or proportioning control is provided on all these non-indicating instruments.

SMITHS SIZE 7 MOTOR

The Size 7 motor, one of the smallest of its type in the world, produced by Smiths Aircraft Instruments Ltd., Cricklewood, London NW2, measures 1.6 in. overall and 0.625 in. o.d. Fully potted, the motor is built with non-corrodable laminations and is suitable for small servo systems. It may be driven from a single-phase 26-v supply in conjunction with a 1.5-mf. tuning capacitor, or from a two-phase 400 c.p.s. supply. One type can be operated directly from a pair of germanium transistors connected to the centre tapped control phase. Speed on no-load is 9,000 r.p.m.; stall torque is 8 g./cm.

SURFACE HEATING UNIT

KNOWN as the MIC/VAR semi-micro-mantle, a new electric surface heating unit (made by Isopad Ltd., Barnet By-Pass, Boreham Wood, Herts), supplements the range of micromantles available for flasks from 5 to 50 cc. capacity. The unit incorporates a temperature control and has been designed in co-operation with Mr. M. A.

Fill, F.R.I.C., of Norwood Technical College, and Dr. J. T. Stock, of the University of Connecticut. The semi-micro-mantle can accommodate spherical and pear-shaped flasks from 10 to 25 cc. capacity. The flasks are cradled in a pliable heating surface made of glass fibre yarn interwoven with insulated electric resistance wire. The grey stove-enamelled metal casing protecting the heater incorporates a variable resistor for the stepless adjustment of the operating temperature. The temperature range is from ambient up to 270°C. This heater is not affected by draughts, nor do liquids spilled on it cause damage.

NEW POWDER BLENDER

A NEW powder blender has been put on the market by the T. P. Chemical Engineering Co. Ltd., Croydon, Surrey. Blending is carried out in a simple cylinder with detachable ends, leaving it completely clear internally when the ends are removed.

Every formula need not be blended in the same vessel, as vessels are readily detachable, and can be supplied in any material. As a result the blended products can be transported where required, and discharged directly into, or adapted to fit on to, a tabletting or packaging machine, etc., or into storage.

If required, the vessel can be filled and emptied without removal from the machine with a built-in hand positioning device, which enables the vessel to be turned gradually into a 'pouring' position. A built-in three-pin power point is provided for the use of a hot-air blower or other auxiliaries.

This unique machine does not demand that powders shall be sifted or even dry.

PLESSEY HYDRAULIC PUMPS

To their range of hydraulic pumps, The Plessey Co. Ltd. of Ilford have added two new series, Beta and Gamma. The company claims that the new types give close gradation of power output, high volumetric efficiency and high-pressure ratings.

The Beta series, square in shape, covers capacities from 0.27 to 4.2 gall. per 1,000 revs, while the oval Gamma series covers outputs from 4.3 to 46 gall. per 1,000 revs. In both designs the gears inside the casings can be varied to give alternative performance as required.

Features of the new series include elimination of the face joint at the junction

of the pressure loaded bearings to help to prevent possible leakage there; more accurate control of relief port position, and bearings which move freely in the body bores. The bearing alignment, too, has been controlled to close limits. Oil feed to the bearings is taken from the suction side of the pump, whereby cool oil is passed through the bearings to provide lubrication and cooling without impairing volumetric efficiency.

Pumps can be assembled for either direction of rotation, depending on the positions of the driving and driven gears, and shaft extensions may be provided. Porting arrangements can also be varied.

LARGE PLASTICS CONTAINER

THE Engel process for the production of polyethylene goods in sizes of up to 50-gall. capacity has been introduced to Britain by Tool Treatments (Chemicals) Ltd., Colliery Road, Birmingham Road, West



**Flexible
plastics
containers**

Bromwich, in conjunction with a German company.

This new casting process need cost, it is claimed, only a few pounds and so makes short runs of 500 products to customers' own designs a practical proposition. One of the company's 16-gall. flexible polyethylene containers with lid costs 52s, ex works.

WAYNE-KERR ELECTRONIC MICROMETER

A UNIQUE method of measurement of small distances with an accuracy in the range of 250 to 40,000 microinches is claimed for a new instrument developed by Wayne Kerr Laboratories Ltd., Chessington, Surrey. In principle the displacement or distance is measured in terms of the capacitance change between the test-piece surface and non-contacting probes which are brought up to this surface, i.e., a capacitor is formed between the surface of the test object and the probe, the spacing of the capacitor determining the value of capacitance.

The capacitor is connected to a transformer coupled bridge and is compared against an internal standard capacitor built into the bridge network. The internal standard capacitor is formed by a parallel arrangement of a fixed plate surrounded by suitable guard electrodes and a movable plate (connected to earth) driven by a precision micrometer. The transformer itself provides two ratios 1 : 1 and 10 : 1 giving a wide range of distances which can be measured. The



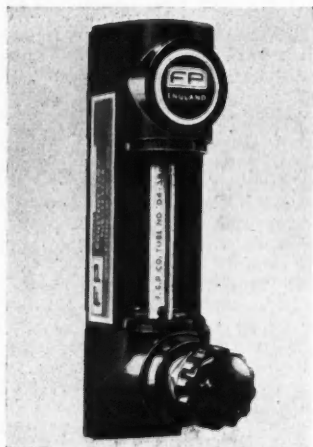
**Isopad semi-
micromantle**

standard capacitor and the probe produce a ratio of 100 : 1 in capacitance. Thus with a normal micrometer used to drive the standard capacitor, the calibration is divided by 100. The micrometer normally sub-divided into 0.2 thou. divisions now reads 0.002 thou. and the precision with which such distance increment is read is the same as in the case of a normal micrometer with divisions of 0.2 thou. The distance measured between the test piece and the probe is then read directly from the micrometer scale.

Some of the applications of the instrument include the sampling and grading of components, the determination of temperature co-efficient of materials and complicated structures, the determination of moduli of elasticity, rigidity and bulk of materials, the determination of Poisson's ratio and the measurement of pressure.

TWO PURGERATOR METERS

To their flowmeter range Fischer and Porter Ltd., Workington, Cumberland, are adding Models 1115 and 1120 Purgerator meters. Though new in the UK, these Purgerators have been produced by Fischer and Porter Co., Hatboro, Penn., for some time in the US.



FP constant flow Purgerator

The Purgerator is a reduced accuracy indicating variable area flowmeter produced primarily for controlling the flow of gases and liquids at a constant rate for bubbler service applications and purging operations, as with corrosive service manometers.

The meter body is manufactured from corrosive-resistant black phenolic plastics and is available with or without an integral 18/8/3 stainless-steel needle valve. The metering tube is of borosilicate glass, and may be scaled in any desired units of flow for 10 to 1 ranges, from 0.08–8 cc/min air to 142–1,420 cc/min water and 3,820–38,200 cc/min air.

Prices range from £3 to approx. £5 10s.

MERCURY VAPOUR METER

The Autoset Hg meter is asserted by its manufacturers, Hanovia Lamps Division of Engelhard Industries Ltd., Bath Road, Slough, to be a development which offers

several advances on their previous mercury vapour meters.

The instrument can be operated on any supply voltage in the range of 200–250 volts, 50 cycles, a.c. without adjustment; or special instruments can be provided with the same facilities for the range 100–120 volts and for 60-cycle operation in either voltage range. 'Zero' and 'deflection' are independent of changes in line voltage. Operation may be preset at any level within the range of the instrument and it may be directly connected into a low-pressure closed circuit to test mercury vapour in laboratory or industrial gas systems.

The following ranges of sensitivity are provided: zero to 200, G/m³, a × 2, or the instrument can be specially adjusted to suit individual requirements. Price quoted is £295 plus packing.

'DRY' BEARING MATERIALS

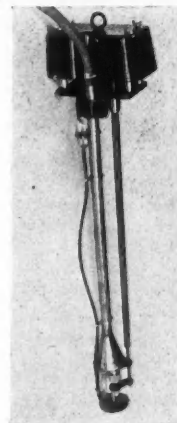
THE Glacier Metal Co. Ltd., of Alpton, Wembley, Middlesex, introduce three new dry bearing materials. DU—comprises thin steel strip with a porous bronze coating impregnated with a mixture of a fluoro-carbon plastics (PTFE) and lead. The new material provides three times the load/speed carrying capacity of DP material which it now supersedes. A stock range of bushes, thrust washers and flat strip are available for manufacturers wishing to conduct their own experiments.

A fluoro-carbon, (PTFE), strengthened with special fillers and supplied in bars and tubes is known as DQ. Non-standards or irregularly shaped dry bearings can be simply machined from this material, supplied from stock in standard diameters. DM is a process for applying an adherent layer about 0.0015/0.0025 in. thick of a combination of fluoro-carbon and molybdenum disulphide to the bearing surfaces of customers' parts sent

to Glacier for treatment. All these new materials incorporate the Fluon brand of polytetrafluoroethylene supplied to Glacier Metal Co. Ltd. by ICI.

NEW ELECTRODE HOLDERS

THE Electrofact instrumentation division of Hartley Electromotives Ltd., 39 Dover Street, London W1, has introduced a new range of electrode holders including a special assembly for automatic cleaning of the glass electrode for use with their industrial pH control equipment. The elec-



Self-cleaning electrode assembly

trode holders utilise O rings for sealing purposes and, apart from ease of servicing, this renders them capable of withstanding pressures up to 100 p.s.i. without leakage.

The self-cleaning electrode assembly is of the immersion type and permits the accurate pH control of liquors which normally cause considerable fouling of the electrodes.

Fire Research Fellowships Established at Universities

FUNDS for the establishment of research fellowships at universities have been made available by the Fire Research and Training Trust for the study of fundamental problems in fire, says 'Fire Research 1957'. The first of these, 'Homogeneous combustion and its suppression by various inhibitors', has been placed at Oxford under Professor Sir Cyril Hinshelwood.

Professor Hinshelwood's team has studied the interaction in the vapour state of a series of related hydrocarbons with oxygen. The hydrocarbons were all members of the cycloparaffin series. Major results so far are:

(1) Ease of oxidation is extremely sensitive to structure, increasing very markedly with the number of carbon atoms but being quite strongly depressed by substitution of methyl groups.

(2) There is a long induction period preceding establishment of the maximum reaction rate.

(3) Rate-concentration relations are rather unusual. Excess oxygen in some circumstances has virtually an inhibiting effect.

(4) The length of the induction period can be very considerably modified by the addition of aldehydes.

The last observation is regarded as important. Aldehydes are probably reaction intermediates. They are capable of catalytic destruction. This suggests that additives could greatly prolong induction periods and so substantially diminish ease of ignition.

The second research fellowship has gone to Imperial College, London, under the supervision of Professor A. R. J. P. Ubbelohde.

A report has been received from the director of the Safety in Mines Research Establishment, Buxton. Forty materials have been subjected to tests to determine their explosibility in the form of a dust cloud. Those placed in class I (dusts that ignite and propagate flame readily, the source of heat required being small) include derris, phthalic anhydride, 'resin rubber' dusts, urea resin, alginate powders, pancreatin and lead stearate.

* Department of Scientific and Industrial Research, HM Stationery Office, 5s.

● **DR. W. A. BAKER**, research manager of the British Non-Ferrous Metals Research Association, is leaving at the end of July to join the Northern Aluminium Co. Ltd. Coming to the BNFMR in 1935, he became senior metallurgist in 1946 and research manager in 1950. To fill the vacancy arising the BNFMR has appointed Mr. A. CIBULA and Mr. R. EBORALL respectively heads of the melting and casting and of the general metallurgy sections—as research superintendents, jointly responsible to the director for the work of the research department.

● **MR. H. W. BOYNE** has joined Colloidal Graphite Ltd., of London and Sheffield, as technical sales representative. Until recently Mr. Boyne was home sales manager of Arthur Balfour and Co. Ltd.

● **DR. P. C. SPENSLEY**, M.A., B.Sc., D.Phil., F.R.I.C., scientific secretary, and **DR. R. H. KIRBY**, B.Com., Ph.D., have been appointed assistant directors of the Tropical Products Institute, 56-62 Gray's Inn Road, London WC1. Dr. Spensley is assistant director, administration and development, and Dr. Kirby is assistant director, economics.

● **MR. DONALD HUDSON**, Hove, and **MR. GWILYM HUGHES**, Colwyn Bay, have been re-elected for a second term as president and vice-president of the Pharmaceutical Society of Great Britain. **MR. W. SPENCER HOWELLS**, Richmond, remains as treasurer for the 12th successive year.

● **MR. BAHIAK KASHMULA**, Ph.C., director-general of medical stores, Government of Iraq, recently arrived in the UK at the invitation of HM Government, on a visit to pharmaceutical firms. All the arrangements for this tour have been made by the Association of British Pharmaceutical Industry.



Lady Hinton, Sir Christopher Hinton, chairman of the Central Electricity Generating Board, and Mr. D. D. Walker, managing director of Evershed and Vignoles Ltd., arriving at the company's new offices at Acton Lane Works, Chiswick on 11 June. The opening ceremony was performed by Sir Christopher

● **DR. J. C. HIGGINS**, Hercules Powder Co. Ltd., has been appointed manager, technical development, paper makers'

People in the NEWS

chemical department. He will act in an advisory capacity to the management of the sales and production departments. Dr. Higgins's sales responsibilities have been assumed by **MR. P. K. BRUCKMAN** and **MR. A. B. HORLOCK**, previously sales representatives of the paper makers' chemical dept.

● **MR. RICHARD BENNETT** has joined the board of directors of the Nutfield Manufacturing Co. Ltd., manufacturing chemists, King's Mill Works, South Nutfield, Redhill.

● **MR. K. S. ESTLIN** has been appointed cable sales manager of Siemens Edison Swan Ltd., and **MR. J. A. E. TRINDER** has been appointed to follow him as London district manager. Mr. Estlin was initially with the Metropolitan Vickers Electrical Co. Ltd., and joined the Edison Swan Co. Ltd. in 1954. Mr. Trinder served as assistant London manager of the newly formed Siemens Edison Swan Ltd. from July 1957.

● **LORD RIVERDALE** has been appointed to the board of Newton Chambers and Co. He is chairman and managing director of Arthur Balfour and Co.

● Members of the new board of Modern Electrolytic Patents and Processes, recently acquired by Roto-Finish (see this page) are **MR. GEORGE MEIER** and **MR. R. B. OLLIVER**, managing director and development director respectively of Roto-Finish. **DR. H. E. ZENTLER GORDON**, one of the founders of Modern Electrolytic, remains a member of the board.

● **MR. ROBERT TOUGH**, chemist in the Imperial Chemical Industries laboratory at Widnes, has retired after 30 years' service. In recognition of this he has been presented with a cheque by **MR. C. G. HARRIS**, research director.

● **DR. HENRY SELIGMAN**, head of the Isotopes Division, UK Atomic Energy Authority, at Harwell, and who has been acting for some months as director of the isotopes work in the International Atomic Energy Agency, made a special visit to Frankfurt for the recent Achema exhibition.

● **MR. WILLIAM E. JENKINS** has been appointed chairman of the APV Co. in succession to **DR. R. J. S. SELIGMAN**, who has retired from the board. Dr. Seligman will continue with the company as president.

● **MR. COLIN E. SPEARING** has been elected to the board of Kellogg International Corporation. Mr. Spearing, who is at present in the US, is to establish a permanent office at Kellogg House, London, from the beginning of next month.

Roto Finish Acquire Controlling Interest

ROTO-FINISH have acquired from Jacquet-Hispano Suiza SA, the controlling interest in Modern Electrolytic Patents and Processes.

Formed in 1948 for the purpose of developing industrial applications of electro polishing and chemical brightening Modern Electrolytic Patents and Processes had on their board, Hispano-Suiza and Almin.

An exclusive licence for the UK and British Commonwealth in respect of metal finishing processes held by the Batelle Development Corporation US, was granted to the company.

New headquarters of the company will be at Mark Road, Hemel Hemstead

UK Chlorine Usage Well Below US Level

DR. R. N. KERR, works manager, Imperial Chemical Industries, Castner-Kellner works, Widnes, stated at a presentation of long-service awards, that due to the considerable upsurge of activity at the works in 1937, the 21 years' service presentations due this year would have to be made in two 'sittings'.

MR. D. H. CARTER, managing director of the general chemicals division, said he regarded the Castner-Kellner works as the senior works in the division.

Referring to chlorine, he said that even today consumption was still only one-third of what it was in the US. Even for that one product there was considerable scope for expansion, provided always that we had in this country the will to increase our standard of living.

Obituary

MR. F. G. ANDRAE, a former sales director of Quickfit and Quartz, Ltd., Stone, Staffs, who has died aged 71, joined the Triplex Safety Glass Co. in 1929. In 1935, on the formation of Quickfit and Quartz, he was appointed sales director of the company which position he held until his retirement in 1950.

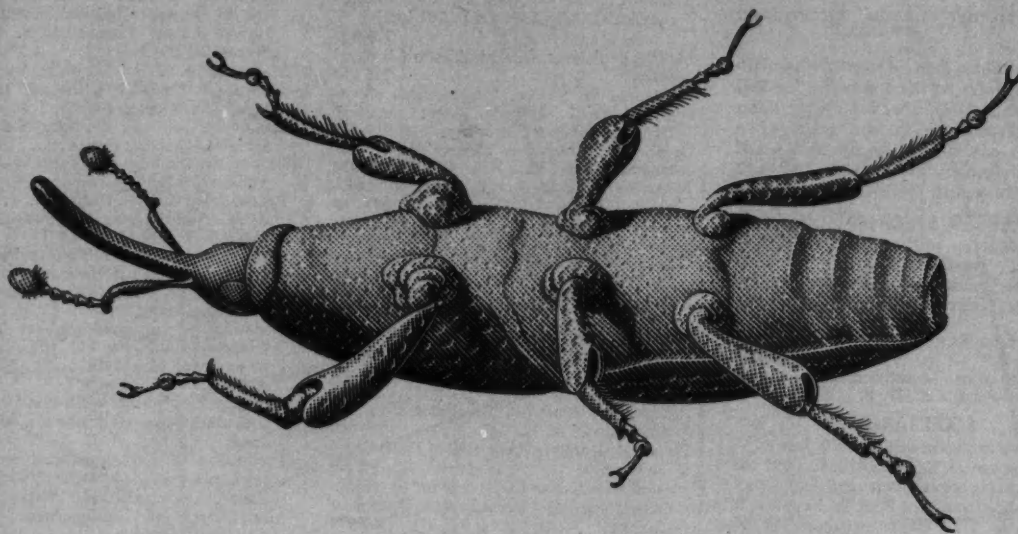
DIARY DATES

TUESDAY 24 JUNE
European Federation of Chemical Engineering—London: Olympia. Until Thursday 26 June. Symposium on the organisation of Chemical Engineering Projects.

THURSDAY 26 JUNE
BFMIRA—London: Hyde Park Hotel, Knightsbridge SW1. 2.45 p.m. Annual general meeting.

FRIDAY 27 JUNE
SCI Pesticides Group—Summer visit to Chesterford Park Research Station of Fison's Pest Control Ltd., Saffron Walden, Essex. 9.45 a.m. train from Liverpool Street to Audley End.

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Detailed information about African Pyrethrum and advice on its use for domestic, industrial and other purposes are available on request.

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The Pyrethrum Board of Tanganyika, Mbeya, Tanganyika Territory
Société Co-opérative des Produits Agricoles, Goma, Belgian Congo

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 3s 3d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

Copies will be on sale 9 July or as soon as possible thereafter

Highly polymeric polymethylene terephthalates. Imperial Chemical Industries, Ltd. 742 811
 Indene. Esso Research & Engineering Co. 761 625
 Preparation of light-sensitive diazotype paper. Andrews Paper Co., H. P. 717 835

ACCEPTANCES

Open to public inspection 9 July

Thickening agents. Koppers Co., Inc. 797 963
 Polyisocyanate compositions and foams produced therefrom. Du Pont de Nemours & Co., E. I. 797 965
 Wax refining process for petroleum wax. Esso Research & Engineering Co. 797 744
 Processes and apparatus for use in the production of calcium. Pechiney Compagnie de Produits Chimiques et Electrometallurgiques. 797 854
 Surface treatments for metallic articles. Bristol Aero-Engines, Ltd. 797 855
 Process for carburising iron and steel. Deutsche Gold- und Silberscheidanstalt Vorm Roessler. 797 915
 Bulk separation of arsenic from germanium. American Smelting & Refining Co. 797 967
 Preparing diresoreyl sulphide. General Aniline & Film Corp. 797 856
 Manufacture of organic compounds containing sulphur and phosphorus. Ciba Ltd. 797 970
 Organosiloxane compositions. Midland Silicones, Ltd. 797 971
 Ketene- and diketene-carbodiimide addition compounds. Farbenfabriken Bayer AG. 797 972
 Demetallisation of hydrocarbon fractions. California Research Corp. 797 857
 Organometallic compounds and synthesis thereof. National Lead Co. 798 001
 Bags for liquid, pasty, pulverous or granular material, and processes for the production, filling and sealing of such bags. Glöyer, W. 797 745
 1, 3-diazacycloalkane compounds. Monsanto Canada, Ltd. 797 714
 Preparing high molecular polymers from isobutylene. Esso Research & Engineering Co. 798 015
 Triisocyanatodiphenyl ethers and sulphides. Du Pont de Nemours & Co., E. I. 797 863
 Organic calcium salts. Farbenfabriken Bayer AG. 797 786
 Alkyl aryl sulphite diesters and insecticidal compositions thereof. United States Rubber Co. 797 865
 Lead dioxide electrodes. Pennsylvania Salt Manufacturing Co. 797 644
 Polybenzimidazoles and method of preparing same. Du Pont de Nemours & Co., E. I. 798 004

Dyeing polyester and cellulose triacetate fibres. Du Pont de Nemours & Co., E. I. 797 646
 Preparation of titanium. Horizons Titanium Corp. 797 934
 Removing chlorates and chlorides from concentrated electrolytic sodium hydroxide. Abbey, A. (Dow Chemical Co.). 798 006
 Copolymers of styrene and butadiene. Petrochemicals, Ltd. [Addition to 761 133.] 798 008
 Making explosives. Olin Mathieson Chemical Corp. 798 010
 Apparatus for gaseous development of exposed diazo sensitised sheet material. General Aniline & Film Corp. 797 935
 Organosiloxane coating compositions. Midland Silicones, Ltd. 797 974
 Preparing white oil. Esso Research & Engineering Co. 797 750
 Stabilisation of monomers. Du Pont de Nemours & Co., E. I. 797 975
 Isolation of tetraalkyltin. Metal & Thermit Corp. 797 976
 Production of betacyanoethyltrichlorosilane. Union Carbide Corp. 797 792
 Hydroforming process. Esso Research & Engineering Co. 798 018
 Sulphonamides of benzoic acid esters. Aktiebolaget Bofors. 797 794
 Air cleaner. American Air Filter Co., Inc. [Divided out of 797 807.] 797 808
 Fluorinated polyurethane resins. Dow Corning Corp. 797 795
 Vitamin-A esters and a process for the manufacture thereof. Hoffmann-La Roche & Co., AG. 797 977
 Unsaturated diols and a process for the manufacture and conversion thereof. Hoffmann-La Roche & Co., AG. 797 655
 Recovering pure isophthalic and terephthalic acid. Olin Mathieson Chemical Corp. 797 797
 Integrated process for manufacture of gasoline and lubricating oils. Esso Research & Engineering Co. 798 019
 Organosilicon compositions. Midland Silicones, Ltd. 797 979
 Cyclic ketone and a process for the manufacture thereof. Hoffmann-La Roche & Co., AG., F. 797 980
 Fuel oil compositions. Esso Standard Soc. Anon. Francaise. [Addition to 788 129.] 797 981
 Preparation of cyclonite. Olin Mathieson Chemical Corp. 797 982
 Preparation of ketoximes. Du Pont de Nemours & Co., E. I. 797 985
 Electroplating zinc on basis metal. Wean Engineering Co., Inc. [Divided out of 797 805.] 797 806

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Separating fluids by thermal diffusion. Beams, J. W. 798 321
 Recovery of polonium. UK Atomic Energy Authority. 798 322
 Detecting changes in the velocity of sound or of ultrasonic vibrations in gases. Coal Industry (Patents), Ltd., and Lawley, L. E. 798 323
 Titanium or titanium base alloys. Imperial Chemical Industries, Ltd., Hands, S., and Freund, A. 798 081
 Water-soluble organic condensates obtained from biguanides. Imperial Chemical Industries, Ltd., Lowe, A., Moyse, J. A., and Wooler, A. M. 798 061
 Means for controlling the level of a liquid in a container. Broadwell Engineering Co., Ltd. 798 212
 Carbon monoxide detection. Parmelee, A. F. [Addition to 673 419.] 798 183
 Colour stabilisation in fuel oils. Socony-Mobil Oil Co., Inc. 798 062

Resinous products prepared from aluminium alcoholate derivatives. Hardman & Holden, Ltd., and Kemp, S. G. 798 186
 Colouring cellulosic textiles. Imperial Chemical Industries, Ltd. [Cognate application 9730.] 798 121
 Furan compounds. Sadolin & Holmblad Aktie-Selskab. [Cognate application 10684.] 798 318 798 319
 3-Pyridinols and intermediates thereof. Sadolin & Holmblad Aktie-Selskab. 798 320
 Fabrication of titanium or titanium base alloys. Imperial Chemical Industries, Ltd., Hands, S., and Freund, A. F. [Divided out of 798 081.] 798 082
 Manufacture of polytetramethylene terephthalate. Imperial Chemical Industries, Ltd. [Addition to 740 381.] 798 187
 Production of 0, 0'-diphenyldioxysilanes. Siemens-Schuckertwerke AG. 798 163
 Process for the finishing of artificial hides or leathers. Alegre, A. A. 798 063
 Recovery of anions. Burstall, J. F., and Ryan, W., [Personal representative of Burstall, F. H. [deceased.]] 798 326
 Method of making lumps of primarily fine granular materials. Burggraf, H. 798 294
 Acid inhibitors. British Petroleum Co., Ltd., and Hainsworth, P. 798 327
 Recovery of uranium valves. Imperial Chemical Industries, Ltd. 798 189
 Production of carboxylic acids. Studienges. Kohle. 798 065
 Derivatives of purine. Wellcome Foundation, Ltd. (Burroughs Wellcome & Co. (U.S.A.), Inc.). 798 165
 Production of electrodeposited metal coatings. Dehydag Deutsche Hydrier-Werke Ges. [Addition to 762 257.] 798 034
 Manufacture of anthracenes. Imperial Chemical Industries, Ltd. 798 167
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 Producing artificial threads and like articles from viscose. American Viscose Corp. 798 192
 Catalyst manufacture. Oxy-Catalyst, Inc. 798 234
 Skin detergents. Enaica Körperpflege Ges. 798 066
 Production of stable peroxide-containing sodium borate. Henkel & Cie. 798 217
 Sulphur from gases or vapours containing hydrogen sulphide. Bahr, E. E. 798 331
 Monoazo dyestuffs of the T-naphthotriazine series and metal complexes thereof. Farbenfabriken Bayer AG. 798 171
 Filters for gases. Birmingham Small Arms Co., Ltd. 798 267
 Process of rendering wool unshrinkable and non-felting. Israel, Director-General of the Ministry of Agriculture, State of, and Levin, M. 798 236
 Production of hydrogen peroxide. Du Pont de Nemours & Co., E. I. 798 237
 Method and apparatus for producing films of organic thermoplastic material. Dow Chemical Co. 798 194
 Removal of other acid gases from mixtures containing carbon dioxide. Dow Chemical Co. 798 070
 Production of thermoplastic films. Courtaulds, Ltd. 798 238
 Electrodes for electrochemical purposes. Siemens-Schuckertwerke AG. 798 109
 Material consisting of ferrosilicon-containing particles and process for preparing same. Knapsack-Griesheim AG. 798 269
 Preventing or reducing mist formation from oils, printing inks, etc. Printing, Packaging & Allied Trades Research Association. 798 111
 Optically detecting presence of solid material in transparent liquids. General Electric Co., Ltd. 798 144
 Production of dichlorbutenes. Distillers Co., Ltd. 798 027 798 028



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BIRMINGHAM : 14-20, Corporation Street, 2. Tel: Midland 6954-8.

GLASGOW : 124, St. Vincent Street, C.2. Tel: Glasgow Central 9561.

BELFAST : 35-37, Boyne Square. Tel: Belfast 26094

DUBLIN : 53, Middle Abbey Street. Tel: Dublin 45775.

Commercial News

Dunlop Rubber

At the annual meeting of the Dunlop Rubber Co. Ltd., on Monday, chairman Mr. G. E. Beharrell revealed that the Fawley synthetic rubber plant would be capable of at least 70,000 tons a year when full production was reached next September. It was probable, he reported, that 70,000 tons could be exceeded with a considerable margin without any significant further capital expenditure.

Production at the plant at Fawley started in March. The plant is owned by The International Synthetic Rubber Co., in which Dunlop has a 45 per cent shareholding. The increase in trade investments from £1.3 million to £2.7 million shown in the group's accounts mainly reflected Dunlop's further investment in ISR Co.

Reviewing the Dunlop group business as a whole, Mr. Beharrell said that the margin of profit to turnover, before tax, was raised from 3.6 per cent to 5.4 per cent; in the second half of the year the percentage was 5.8 per cent. Some 70 per cent of the total turnover of £161 million went overseas.

O. and M. Kleemann

In his review of activities of O. and M. Kleemann Ltd., Mr. D. Kleemann, chairman and joint managing director, noted that the turnover for the group had shown a useful increase (£140,030, against £110,271 for the 16 months' period ended 31 December 1957). Manufacturing and trading activities of the parent company are being carried on by the new subsidiary company, Kleemann Plastics Ltd. Competition is reported as being extremely keen, but orders in hand at the present time are well in advance of the same position at this time last year.

Kleestron, in which subsidiary Shell Chemicals have an interest, have maintained sales and have earned reasonable profits.

Discussing the Erinoid business which became a Kleemann subsidiary at the end of the financial year, Mr. Kleemann said that the decline in casein sales had affected the profit-earning capacity of Erinoid. Close attention was to be given to rejuvenating this department. Production of cellulose acetate moulding powder was at a reasonably high level and it was hoped to be able to improve the profit-earning capacity of this section.

During the last five months' trading since Erinoid's last published accounts a substantial loss has arisen. This loss

- **ISR Synthetic Rubber Plant Now on Stream**
- **Kleemann Say 'Erinoid Loss is Substantial'**
- **BNS Consolidated Profits up by Over £1 m.**
- **Beecham Group Raise Capital by £6m.**

is due to a heavy writing down of stocks which was essential in the view of the present management. Current trade is reported as being 'not unsatisfactory'.

Brit. Nylon Spinners

Consolidated profits of British Nylon Spinners, owned in equal shares by Imperial Chemical Industries and Courtaulds, for 1957 rose from £8,763,188 to £9,619,448. The profit is struck after £992,733 against £913,520 for depreciation and obsolescence, and £500,000 (same) to reserve towards the increased cost of replacement of fixed assets. With £479,785 (£407,120) for interest on bank deposits, Government securities, etc., total profit is £10,099,233 (£9,170,308). Taxes absorb £5.4 million (£5.04 million), leaving a balance of £4,699,233 compared with £4,130,308.

The report states that demand for nylon yarns continued to rise and sales were increased during the year as the planned capacity at Doncaster became available. Work has begun on an extension of this factory, estimated to cost over £3 million, which is scheduled to be completed during 1959.

Production of the full scheduled capacity of nylon polymer at the new Wilton plant of ICI is expected to be achieved before the end of 1958.

A revaluation of fixed assets has been completed since the close of the year. An increase of the order of £7 million over the present net book value is shown.

Amber Chemicals

The half-year's arrears of dividend on the 5 per cent cumulative preference shares for the six months to 30 June 1954, will be payable on 30 June.

Simon-Carves Ltd.

Reviewing the year for Simon-Carves, chairman Mr. R. B. Potter said that the consolidated net profit of £1,409,000 before tax was some £34,000 higher, and was a record. Relatively heavy expenditure had been incurred on research and development, particularly on nuclear power.

Business continued at a high level and turnover again rose by rather more than 10 per cent. Present contracts should ensure reasonable prosperity for the next few years.

Regarding technical development by the

coke oven department, Mr. Potter said that further work was accomplished on the large pilot plant for washing sulphur out of flue gases at the north Guildford power station. The department was now also interested in a process for complete gasification of low-grade coal.

As there was still no sign of any major expansion of acid production in Britain, the sulphuric acid division had again concentrated on exports. Orders had been secured for acid plants in New Zealand, Australia, South Africa, India and Mexico.

Chemical Engineering Wiltons had made continued progress in Britain and export markets. The Australian and South African companies were engaged on a number of sulphuric acid plants.

INCREASE OF CAPITAL

BEECHAM GROUP LTD., 55/6 Pall Mall, London SW1. Increased by £6,000,000 beyond the registered capital of £10,000,000.

Market Reports

Copper Sulphate Dearer

LONDON Trading conditions on the industrial chemicals market during the past week have been steady and with few exceptions prices are unchanged at recent levels. Copper sulphate is dearer at £70 per ton less 2 per cent f.o.b. Liverpool, while dearer quotations are reported for the zinc oxides. Export enquiry has been reasonably good, covering a wide range of materials, but buyers are seeking keen quotations.

The movement in the coal-tar products market has been mostly against existing commitments with a steady trade being done in creosote oil and carbolic acid.

MANCHESTER Quotations generally on the Manchester market for heavy chemical products have maintained a steady undertone, with no changes of any consequence. A moderate volume of additional business has been placed by home consumers, but forward buying is less in evidence than is normal. Existing commitments are being drawn against fairly steadily so far as the alkalis and most other lines are concerned, though there are still a number of relatively weak spots among consumers. There is a fair call for creosote oil and refined tar.

(continued on next page)



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TRADE NOTES

Texas Instruments Expansion

Demand for silicon semiconductors has increased so much since Texas Instruments Ltd. opened their plant at Bedford last October that an extension is now in hand. It is due for completion in August of this year. Demand rose rapidly following two substantial price reductions announced on 1 February and 1 June of this year.

Aero Change Name

Aero Research Ltd., Duxford, Cambridgeshire, have decided to change their name to CIBA (ARL) Ltd. in conformity with the parent concern. The change will operate from 30 June.

ICI's New Rubber Antioxidants

Two new non-staining rubber antioxidants are announced by Imperial Chemical Industries Ltd. The compounds are Monox CNS and Nonox CGP. The former is described as combining the characteristics of an efficient copper inhibitor with those of a conventional antioxidant. It can be used either alone or in combination with other non-staining antioxidants to boost their copper-inhibiting properties. Exceptional efficiency in operation is claimed for it and it is stated to be equally suitable for use in heat-cured and sulphur-chloride-cured rubber. It can also be used in uncured rubber and for foamed and unfoamed latex compounds.

Nonox CGP is reported to confer a high

degree of protection on rubber liable to contamination by copper or manganese. It is suitable for heat-cured and sulphur-chloride-cured rubbers.

New Subsidiary

M. P. Components Ltd., which is a wholly-owned subsidiary of Cawley Plastics Ltd., of Wey Lock Works, Byfleet Road, New Haw, Weybridge, has been formed to serve both trade and industrial fabricators. The company can supply, off the shelf, sheet and tube in unplasticised p.v.c., both normal and high impact, and will have available a number of ranges of components to be used by fabricators. The first range is that of stubflange couplings in sizes from $\frac{1}{4}$ in. to 6 in.

Permutit in Canada

The Permutit Co. Ltd., Gunnersbury Avenue, London W4, have established a subsidiary company in Canada. Operating under the name of Ion Exchange (Canada) Ltd., it will undertake the design of water treatment and ion exchange plant to meet Canadian needs. The company is located in Toronto and has already completed a large programme of ion exchange plant work for the Canadian uranium mines. Mr. A. Himsley heads the company as general manager.

Silicone Release Coatings

Midland Silicones Ltd., 19 Upper Brook Street, London W1, have developed two

products for use as release coatings on paper. They are MS development products 2218 and 2219.

Advantage claimed for the new products is that even after long contact with a wide range of materials, including pressure-sensitive adhesives and bitumen, coated papers give excellent release, and there is no risk of contaminating materials by migration.

Portable Liquid Pump

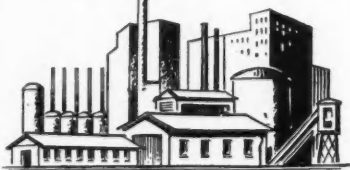
In an account of the portable electric barrel pumps made by British Central Electric Co. Ltd., 6 and 8 Rosebery Avenue, London EC1 (CHEMICAL AGE, 7 June, p. 1035), it was stated that the cut-out operates at 60°F. This should have read 160°F.

Market Reports

(Continued from page 1174)

GLASGOW Although there is still a tendency towards recession in certain industries, business during the past week in the Scottish heavy chemical market was much more active. Demands were fairly well maintained, particularly those in the range of heavy chemicals, both in regard to spot and contract requirements. Prices on the whole remained firm, showing little change. The demands for agricultural chemicals are still brisk, with a steady volume of orders being received. The export market is still continuing at a good level.

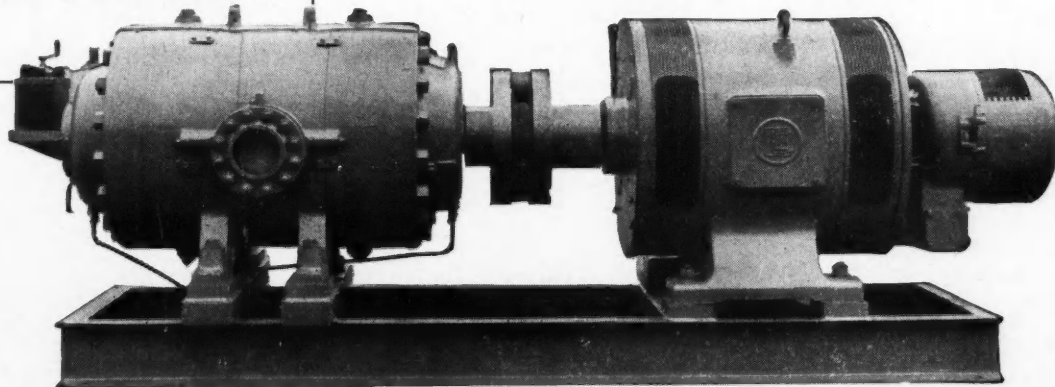
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